

THE JOURNAL of the Michigan State Medical Society

VOLUME 52

OCTOBER, 1953

NUMBER 10

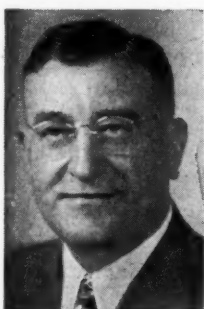
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Table of Contents

Obesity—Key to the Prevention of Diabetes. <i>William H. Olmsted, M.D.</i>	1057
Obesity—Clinical Observations. <i>Robert C. Moehlig, M.D.</i>	1062
Control of the Diabetic. <i>William S. Reveno, M.D.</i>	1064
Diabetic Coma and Its Treatment. <i>William W. Engstrom, M.D.</i>	1068
The Problem of Diabetic Retinopathy. <i>Joseph T. Beardwood, Jr., M.D., and Robert H. Trueman, M.D.</i>	1074
Functional Rehabilitation in Diabetes. <i>George E. Anderson, M.D.</i>	1080
The Art of Using the Insulins in Treatment of Diabetes. <i>Crosby D. Eaton, M.D.</i>	1086
Diabetes and Tuberculosis. <i>George C. Thosteson, M.D., and Ruth S. Tibbits, M.D.</i>	1088
The Kimmelstiel-Wilson Syndrome. <i>Laurence F. Segar, M.D.</i>	1092
Fructose Metabolism in Diabetes. <i>Holbrooke S. Seltzer, M.D., and Jerome W. Conn, M.D.</i>	1095
Michigan State Medical Assistants Society. <i>Mrs. Elizabeth E. Peck</i>	1100
The Present State of Tonography. <i>Peter C. Kronfeld, M.D.</i>	1101
Shall Basic Science Laws be Repealed or Revised to Contain the Essentials of a Uniform Basic Science Act? <i>J. Earl McIntyre, M.D.</i>	1102
Medical Licensure in Michigan. <i>E. C. Swanson, M.D.</i>	1106
Michigan State Medical Society Past Presidents, 1886-1893	1108
President's Message: To Work in Harmony Makes Progress.....	1109
Editorial:	
Needed Federal Legislation.....	1110
The President's Health.....	1110
Group Health and Accident Insurance.....	1111
Lynn Stinson—Good Citizen.....	1112
Michigan's Department of Health.....	1114
News Medical.....	1116
The Doctor's Library.....	1132
In Memoriam.....	1133
You and Your Business	1030
Doctor Rector—Twenty-three Years of Service....	1034
Heart Beats.....	1036
PR Report.....	1038
Editorial Comment.....	1040

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1027

THE JOURNAL of the Michigan State Medical Society

VOLUME 52

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1028



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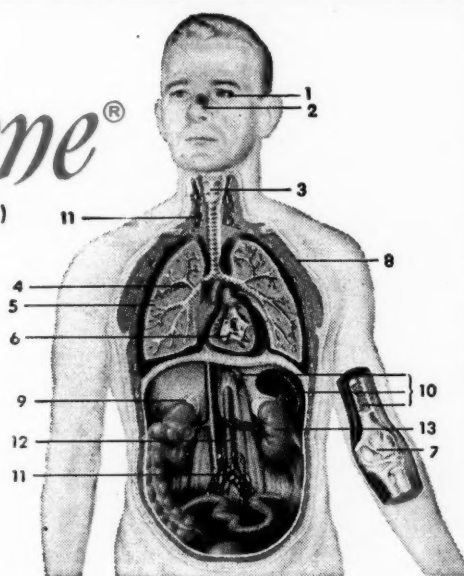
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1. **EYE**—Inflammatory eye disease. 2. **NOSE**—Intractable hay fever. 3. **LARYNX**—Laryngeal edema (allergic). 4. **BRONCHI**—Intractable bronchial asthma. 5. **LUNG**—Sarcoidosis. 6. **HEART**—Acute rheumatic fever with carditis. 7. **BONES, JOINTS, AND BURSAE**—Osteoarthritis; Rheumatoid arthritis; Rheumatoid spondylitis; Acute gouty arthritis; Still's disease; Psoriatic arthritis; Bursitis. 8. **SKIN AND CONNECTIVE TISSUE**—Pemphigus; Disseminated lupus erythematosus; Scleroderma (early); Dermatomyositis; Atopic dermatitis; Exfoliative dermatitis; Dermatitis venenata (e.g., poison ivy); Dermatitis medicamentosa. 9. **ADRENAL GLAND**—Congenital adrenal hyperplasia; Addison's disease; Following adrenalectomy for hypertension, Cushing's syndrome, and neoplastic diseases. 10. **BLOOD, BONE, AND MARROW**—Allergic purpura; Acute leukemia* (lymphocytic or granulocytic); Chronic lymphatic leukemia.* 11. **LYMPH NODES**—Lymphosarcoma; * Hodgkin's disease.* 12. **ARTERIES AND CONNECTIVE TISSUE**—Periarthritis nodosa (early). 13. **KIDNEY**—Nephrotic syndrome, without uremia (to induce withdrawal diuresis). 14. **VARIOUS TISSUES**—Angioneurotic edema; Serum sickness; Sarcoidosis; Drug sensitization; Waterhouse-Friderichsen syndrome.

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A TASK AND A WARNING

Mrs. Oveta Culp Hobby, Secretary of Health, Education and Welfare, voiced the views of the current Administration in Washington when she told the 1953 meeting of the AMA House of Delegates that organized medicine must find solutions to the socio-economic problems facing Medicine today or the solution would be taken out of its hands.

She declared that the "impairment of the principle of a free choice and consent in medical care," which "is inherent in a compulsory program of medical care, therefore represents a break in the fabric of our democratic system."

"The Administration," Mrs. Hobby added, "is looking first to the physicians of the country for leadership in meeting this challenge. Second, it looks to the individual citizen to meet his responsibilities; by making full use of resources made available to him through modern medicine for the preservation of his health, by prudent participation in prepaid plans for medical care, and by assumption of common responsibilities for the advancement of the health of our nation.

"Thirdly, this Administration looks to the community, acting both through its private voluntary associations and its governmental bodies, for help in meeting this challenge."

WAYNE COUNTY MEDICAL SOCIETY AND DETROIT FREE PRESS SPONSOR SEVEN-WEEK MEDICAL FORUM

An unusual seven-week program, planned to give Detroiters the latest and most accurate information on common illnesses, is being staged this fall by the Wayne County Medical Society in co-operation with the *Detroit Free Press*.

This Medical Forum started in late September and will run through November with weekly programs, all held in the Rackham Memorial Auditorium, Detroit.

Each of the seven weekly meetings in the series will deal with a different subject of medicine or health. The public has been invited to attend, free of charge. The *Free Press*, in several editions, offered a ballot which listed a number of subjects and provided blank spaces for others, to be filled out by the readers.

The Forum is a public service enterprise. The lecturers will be representatives of the entire medical profession of the area who promise plain answers to medical questions.

As the *Free Press* stated in its Sunday, August

23, announcement of this Medical Forum: "The purpose is to bring the public the truth about medical problems which concern the people most."

PROPOSED WIDENING OF SOCIAL SECURITY MEETS OBJECTIONS

The national organizations of doctors of medicine, lawyers and dentists objected to the Administration's recent plan to bring their members under Social Security. A spokesman for the AMA said that his organization is "definitely and officially opposed" to including doctors of medicine in Social Security. The AMA's Bureau of Medical Economic Research estimated that 150,000 to 175,000 of the nation's 215,000 M.D.'s would receive coverage under the proposal—but the plan doesn't fit the economic pattern of a physician's life. "Under the plan, if you earn more than \$75 a month after you are sixty-five, you don't collect, and many doctors would never benefit from the system," stated the AMA's spokesman.

HIGHLIGHTS OF EXECUTIVE COMMITTEE OF THE COUNCIL

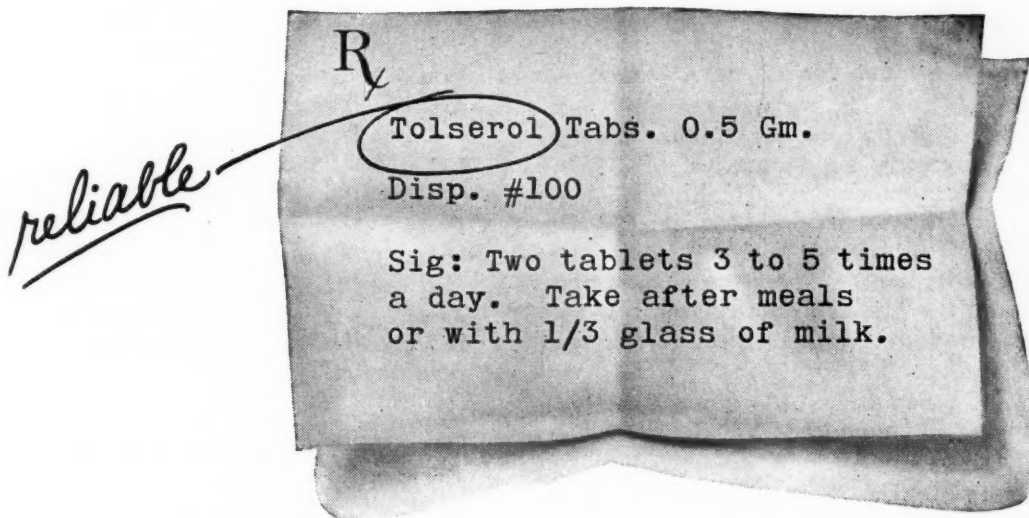
August 12, 1953

Forty-nine items were presented to the Executive Committee of The Council on August 12. Chief in importance were:

- *The monthly financial reports* and bills payable were studied and approved.
- *A legal brief* on Michigan statutes covering fees for surgical assistants was requested of the MSMS Legal Counsel.
- *Committee Reports*—The following reports were given consideration: (a) Committee on Venereal Disease Control, meeting of July 10; (b) Committee on Arbitration, meeting of July 17; (c) Study Committee on Basic Science Act, meeting of July 29; (d) Public Relations Committee, meeting of August 2.
- *William Bromme, M.D.*, Detroit, was authorized to attend a meeting in Chicago on September 1 of representatives of the AMA and representatives of veterans organizations. The fine liaison work being done in Michigan with the various veterans organizations and the need to continue this on the national level was discussed.
- *Statement of R. H. Pino, M.D.*, Detroit, concerning the status of medicine as big business

(Continued on Page 1032)

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EXECUTIVE COMMITTEE OF THE COUNCIL

(Continued from Page 1030)

- and needed reorganization in the AMA was referred to a Special Committee (President, President-Elect, Council Chairman and Speaker of House of Delegates) to digest and to report to The Council on September 20, for ultimate presentation to the House of Delegates on September 21.
- *Organization of an over-all Cancer Co-ordinating Committee*, representative of MSMS, Michigan Department of Health, Michigan Health Officers Association, Michigan Division of the American Cancer Society, Southeastern Michigan Division of the American Cancer Society, and the Michigan State Dental Society, was announced by President-Elect L. W. Hull, M.D., Detroit.
 - *The 1953-54 Beaumont Memorial Committee* personnel was announced by President-Elect Hull.
 - *A Subcommittee of the Child Welfare Committee* on School Health Problems was authorized and is to be appointed by Chairman G. E. Anthony, M.D., of Flint.
 - *Reappointment of A. Hazen Price, M.D.*, Detroit, as MSMS representative to the Advisory Committee for Practical Nurse Education, a committee of the Michigan Dept. of Public Instruction, was approved.
 - *Report of A. C. Furstenberg, M.D.*, Ann Arbor, re meeting of the Committee for the National Fund for Medical Education, was presented and approved, with thanks.
 - *The Annual Reports* of all MSMS Committees were presented by Secretary Foster and ordered published in the Handbook for Delegates, for presentation to the House of Delegates on September 21 in Grand Rapids.
 - *"Golden Goose" Breakfast* of September 24 in Grand Rapids. All Michigan hospitals have certified the names of their chiefs of staff, for invitation to the Golden Goose Breakfast, to be held during the MSMS Annual Session. The program of this meeting was approved. All MSMS members present in Grand Rapids on September 24, are to receive invitations to attend this complimentary breakfast.
 - *The House of Friendship* assignments for the 1953 Annual Session (Hospitality Committee) were made, including all members of The Council.
 - *Compliments* from the Michigan Bell Telephone Company on the MSMS Secretary's Letter of July 22, 1953, were read and ordered placed on file.
 - *Suggested covers for JMSMS* for the year 1954 were presented by Editor Wilfrid Haughey,

M.D., Battle Creek, and approved; Dr. Haughey also recommended an interprofessional number of JMSMS to include articles by lawyers, architects, et cetera.

- *Public Relations Counsel's report* included (a) request from Metropolitan Life Insurance Co. for a letter from MSMS re distribution to Michigan theaters of the film "Losing to Win," a movie on weight control which request was granted; (b) reprints of the Bob Goldman article "The Truth about Russian Medicine" published in *Parade Magazine*, was referred to the AMA for consideration; (c) progress report on contacts and medical P.R. in general.
- *Grand View Hospital*. A letter from the Gogebic County Medical Society requesting assistance in a pending legal suit, was discussed. This request is to be granted if the Gogebic County Medical Society secures approval of the Attorney of Record.

MEDICAL MEETINGS AND CLINIC DAYS

A list of known medical meetings and clinic days, sponsored by county medical societies and other physicians' groups in Michigan, follows:

1953			
Nov. 9-10	State Medical Journal Conference (AMA)	Chicago	
Nov. 18	Executive Committee of The Council (MSMS)	Detroit	
Dec. 16	Executive Committee of The Council (MSMS)	Detroit	
Dec. 1-4	AMA Clinical Session	St. Louis, Mo.	
1954			
Jan. 28-30	The Council (MSMS)	Detroit	
Jan. 31	County Secretaries-Public Relations Conference	Detroit	
Mar. 9	American College of Surgeons, Michigan Chapter	Sheraton-Cadillac Hotel, Detroit	
Mar. 10-12	Michigan Clinical Institute	Sheraton-Cadillac Hotel, Detroit	
Apr. 14	Genesee County Medical Society Ninth Annual Cancer Day	Flint	
May 12	Annual Clinic Day and Alumni Reunion of the Wayne University College of Medicine,	Fort Shelby Detroit	

Additions to this list of meetings are invited by the Editor of JMSMS, in order to make this monthly announcement complete and accurate.

JMSMS

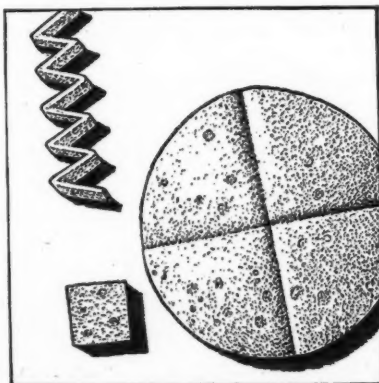
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Frank L. Rector, M.D., Lansing, retired on October 1, 1953, from active participation in the cancer control program after twenty-three years of service in that field.

For eleven years, he was the midwestern Field Representative of the American Cancer Society, Inc., during which time he made detailed cancer surveys in eight states. This was followed by five years as Cancer Consultant for the Michigan Department of Health. For the past seven years he has been the secretary of the Cancer Control Committee, Michigan State Medical Society.

During his years of service, Dr. Rector developed a keen interest in lay cancer education, especially among high school age groups. In addition to preparing the text of "The Story of Cancer for High Schools," recently published by the Cancer Control Committee, he has published many articles in medical, nursing and educational journals. He has spoken to more than 925 high school audiences and to an equal or greater number of adult lay groups.

In 1952, he was the first recipient of the award of the Public Health Cancer Association of America, at its annual meeting in Cleveland, Ohio, for his contribution to cancer education and control. In March, 1953, the Michigan State Medical Society presented him with a scroll of appreciation for his efforts in lay cancer education.

FEDERAL COURT HOLDS NAMES AND ADDRESSES OF PATIENTS ARE NOT CONFIDENTIAL

The Commissioner of Internal Revenue issued a summons directed to a hospital to appear before a special agent at a given time and place to give testimony as to the tax liability of a member of the medical staff. The summons required the production of books, papers and records and specifically required the records of the names and addresses of this doctor's patients admitted to the hospital on his instructions during a four-year period. At the bottom of the summons a sentence was typed as follows:

"Appearance is waived if the agent is permitted to examine the records or if the desired information or data is submitted by your institution."

The administrator of the hospital refused to comply with the summons or to permit the examination. The information or data was not submitted.

An order was thereafter issued by the court requiring that the hospital permit the examination of its records by an agent of the Internal Revenue Bureau. The representatives of the hospital and the physician appeared before the court and expressed their uncertainty as to whether the voluntary productions of the information desired would be in violation of Section 352 of the New York Civil Practice Act. The hospital and the doctor sought to vacate the order upon the ground that compliance with the order would constitute the divulging of privileged and confidential communications.

Actually the only question remaining for decision was whether the furnishing of the names and addresses of a doctor's patients by the hospital from or by its records would infringe upon the prohibition or privilege provided in the statute.

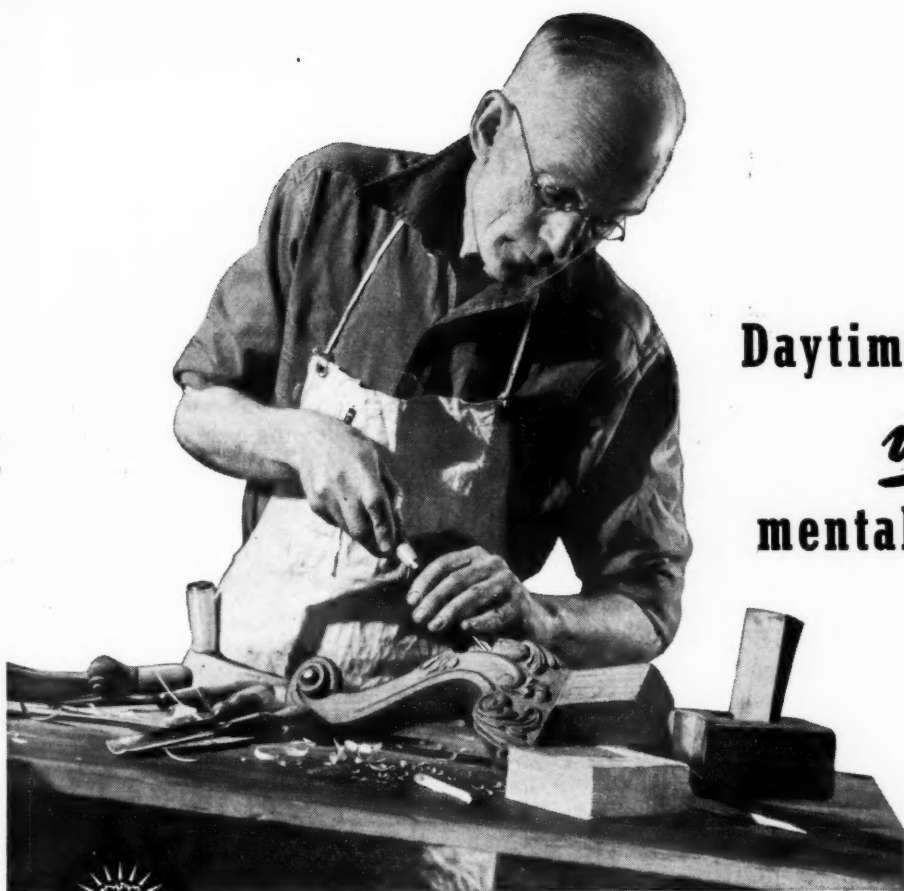
The courts have held that the nature of the privilege has never been extended to prohibit the disclosure of evidence as to facts not acquired in a professional capacity. Incidents and facts which are plain to the observation of anyone are to protect the patient in his relationship with the physician and to prevent the disclosure of information which might result in humiliation, embarrassment or disgrace.

An examination of the New York precedents, said the court, leads to the conclusion that the information requested by the Commissioner of Internal Revenue was not privileged.

"This court cannot understand how a person is injured by the disclosure of the fact that he has received the services and care of a hospital, and has been attended by a certain physician. These are everyday incidents of life occurring openly and with notoriety. The patient does not secrete his entry into the hospital, neither does the doctor mask his identity when entering the home or room of his patient. Any injury to the patient is hypothetical rather than actual. Inasmuch as there is no positive evidence here that the books and records of the hospital cannot be inspected to obtain the information authorized without the disclosure of information which properly be termed confidential, the motions will be denied. The hospital, however, is to take all precautions necessary so diagnosis of his illness shall not be disclosed. If further instructions as to the procedure to be followed is desired of this Court by any party, application may be made therefore."

(In the matter of the Application to Examine the Books and Records of the Albert Lindley Lee Memorial Hospital, U. S. District Court, Northern District of N. Y. Stephen W. Brennan, Justice; decided February 25, 1953).

—Michigan Hospital Association Bulletin, July, 1953.



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Heart Beats

MEMORIAL FUND PRODUCES PROMISING RESEARCH

Headlines appeared recently in the nation's scientific journals citing special progress in research on the use of chemicals in aiding arteries.

The story behind these headlines was written in Michigan by a research team at Wayne University, working under a Memorial Fund grant from the Michigan Heart Association.

As one report stated: "the new discovery indicates that the sodium salt of ethylenediaminetetraacetic acid (commercially known as Versene) can control the manner in which the body handles the fatty substances which it takes in." The extensive research studies, which have been carried on over a period of three years, are providing an important clue to unlocking many of the hidden secrets of atherosclerosis.

Particularly noteworthy is the fact that this research was made possible by "in memoriam" gifts. Instead of sending gifts that wither—the donors have, in effect, given research that lives, for the Memorial Fund is a special project of the Michigan Heart Association dedicated particularly to research in cardiovascular diseases. It derives its sole support from memorial contributions of an ever-increasing number of persons who find deep satisfaction in providing a "living memorial" to a deceased friend, relative or associate.

The investigations on Versene are being carried out by Albert J. Boyle, M.D., Henry S. M. Uhl, M.D., Gordon B. Myers, M.D., Bennie Zak, Ph.D., Albert Slatkis, Ph.D., and Mr. Harold Brown (a research fellow). The four financial grants which total more than \$20,000.00 were made for the fiscal year beginning July 1, 1953.

In addition to monies allocated for these research studies the following research projects are also receiving financial support from the Michigan Heart Association Memorial Fund:

Harper Hospital—Research Division—Detroit, Michigan

Grant: \$4,200.00

Investigators: Aran S. Johnson, M.D., Robert A. Gerisch, M.D., Harry C. Saltzstein, M.D., S. R. Scheinberg, M.D.

University of Michigan—Ann Arbor, Michigan

Grant: \$3,000.00

Investigator: Franklin D. Johnston, M.D.

University of Michigan—Ann Arbor, Michigan

Grant: \$5,500.00

Investigator: David F. Bohr, M.D.

In addition to the Memorial Projects, the Michigan Heart Association is providing financial support, amounting to more than \$78,000.00 during the current fiscal year, to sixteen other important heart research projects.

The Michigan Heart Association has expressed its grateful appreciation to Michigan's Doctors who have, and are now urging gifts directly to the Memorial fund of the Association. Deductible for income tax purposes these gifts serve the highly useful purpose of providing funds used especially for research studies in the field of cardiovascular diseases. Memorial Contributions can be made directly to the Michigan Heart Association, 4421 Woodward Avenue, Detroit 1, Michigan. Of course, special acknowledgments are made to donors and next of kin immediately upon receipt of memorial contributions.

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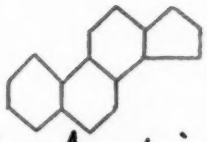
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PR REPORT

SPARKED by Science Writer Jack Pickering of the *Detroit Times*, Detroit newspapermen were quick to expose the "log jam" in the State Basic Science Board office which has prevented many qualified M.D.'s from moving to Michigan to enter practice. Realizing that one man's attitude was at odds with the best interests of the citizens of Michigan, the reporters went to work to place the facts before the public.

The problem is one which MSMS has recognized for some time, one of sufficient importance to cause the 1952 House of Delegates to appoint a special study committee. It is hoped that by the time this number of *THE JOURNAL* is published, the current Basic Science "log jam" will be unblocked. Both MSMS and the Governor's Office are working towards that end as we go to press (September 9, 1953).

JUST RELEASED for television are three excellent film features and one series of six five-minute "shorts." Brand new are "Operation Herbert" and "A Citizen Participates" running about 28 minutes each and dealing with timely medical subjects of wide general interest. "Your Doctor," the excellent 15-minute documentary film produced by Louis de Rochemont which was hailed in its commercial theater showings, has just been made available for the first time for television.

All are reserved exclusively for use by medical societies and may be booked through the AMA Television Film Library or the MSMS Public Relations Department.

"Operation Herbert" has a humorous touch, but effectively demonstrates how it costs less to have an appendectomy now than it did in 1937. Jackie Kelk, popular screen and TV actor, is starred. "A Citizen Participates," a documentary-type story actually filmed in a small Kansas town, tells how a citizen sparks a campaign to bring an M.D. to a small town.

"What To Do" is the title of the five-minute series. The six films deal with common home medical problems.

"Operation Herbert" and "A Citizen Participates" are also available for showing to schools and clubs. The latter is particularly adapted to Kiwanis clubs, since Kiwanians play a part in it.

A GENEROUS SUPPLY of PR inspiration and information for a new year of activity was acquired by MSMS and county society leaders, as well as by staff members, at the annual AMA Public Relations Institute in Chicago, September 2 and 3. Michigan representatives also played important roles in conducting the Institute.

Serving on the three-man panel in one of the most popular clinic sessions, which dealt with the subject "What Methods Can Be Used to Combat Cultists and Quacks?" was Orlen J. Johnson, M.D., of Bay City, PR Chairman of the Bay County Medical Society.

Hugh W. Brenneman, PR Counsel for MSMS, was chairman of a much-discussed session in which audience members broke up into small "PR committees," each committee developing a PR program tailor-made to meet a "hypothetical" situation embracing actual day-to-day medical PR problems.

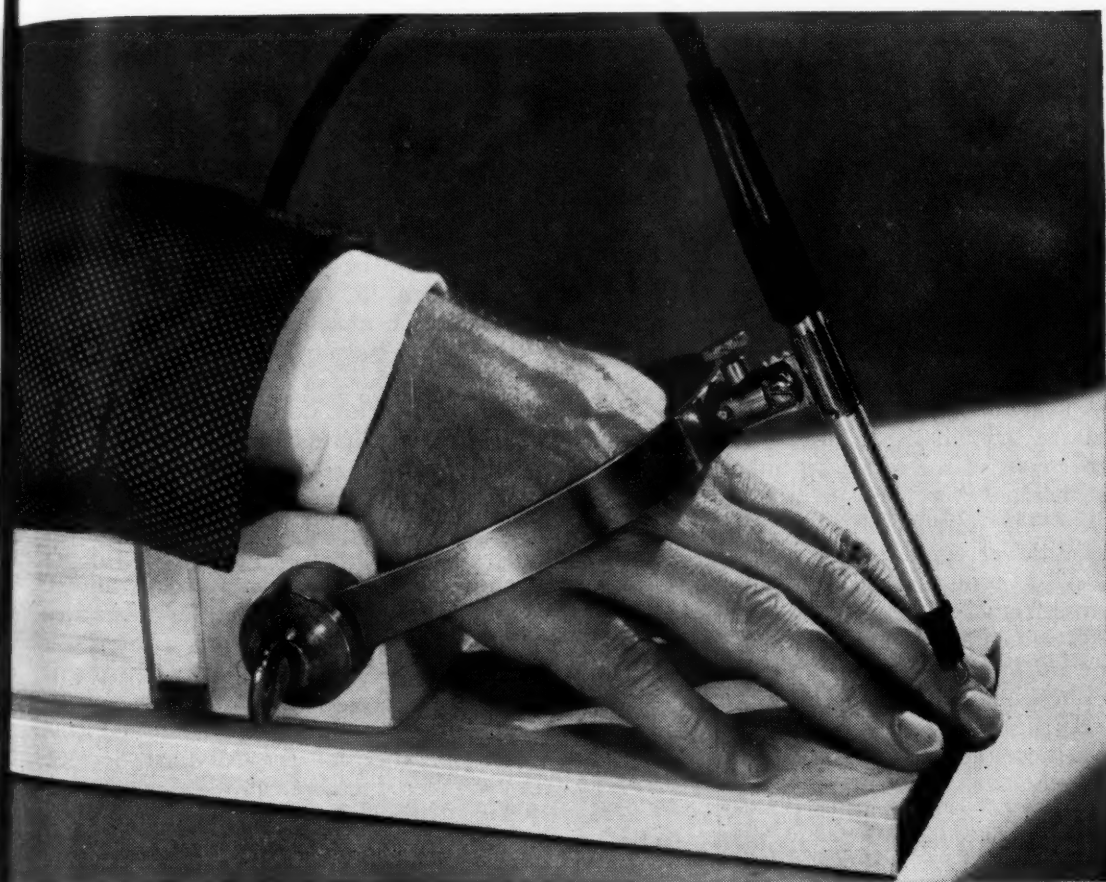
The MSMS delegation was headed by C. Allen Payne, M.D., of Grand Rapids, Chairman of the Public Relations Committee. Among other Michigan representatives were W. G. Gamble, Jr., M.D., Bay City, MSMS PR Committee member; H. C. Bodmer, M.D., Kalamazoo, PR Chairman of the Kalamazoo County Medical Society; John R. Pedden, M.D., Grand Rapids, President-elect of the Kent County Medical Society; Mrs. W. S. Stinson, Bay City, now President of the MSMS Woman's Auxiliary; Mrs. O. J. Johnson, Bay City, and the MSMS Public Relations staff.

AN OUTSTANDING CONTRIBUTION to the AMA Conference on Veterans' Medical Care in Chicago, September 1, was made by William Bromme, M.D., of Detroit, Chairman of The Council, MSMS, in keeping the discussion of non-service connected disabilities "on the beam." His concepts were bolstered by an understanding of the veteran's viewpoint gained through the effective liaison developed at the state level in recent years between MSMS and four major veterans' organizations. Others from Michigan at the conference were Hugh W. Brenneman, MSMS Public Relations Counsel, and John W. Castellucci, Detroit, Assistant to the Director, Michigan Medical Service.

Physiological test

compares **Kent's**

"Micronite" Filter with other cigarette filters



To compare the efficiency of various filters as they affect physiological responses in the cigarette smoker, drop in surface skin temperature at the last phalanx was measured.

Using well-established procedures, the subject smoked conventional filter cigarettes and the new KENT with the exclusive "Micronite" Filter.

For every other filter cigarette, the drop in temperature averaged over 6 degrees. For KENT's Micronite Filter, there was no appreciable drop.

These findings confirm the results of other scientific measurements that show these facts: ordinary cotton, cellulose or crepe paper filters remove a small but ineffective amount of nicotine and tars; KENT's Micronite Filter

approaches 7 times the efficiency of other filters in the removal of nicotine and tars and is virtually twice as effective as the next most efficient cigarette filter.

Thus KENT, with the first filter that really works, gives the one smoker out of every three who is susceptible to nicotine and tars the protection he needs . . . while offering the satisfaction he expects of fine tobacco.

For these reasons, smokers have made the new KENT the most popular new brand of cigarette to be introduced in the last 20 years.

If you have yet to try the new KENT, may we suggest you do so soon?

Takes out up to 7 times more nicotine and tars than other filter cigarettes



Editorial Comment

GERIATRIC AVALANCHE IN MOTION

The *Pennsylvania Medical Journal* for August, 1953, has a strong Editorial, with the above title, referring to a paper by Frank A. Weiser, M.D., of Detroit, which appeared in *THE JOURNAL* of Michigan State Medical Society for May—was the lead article—title, "General Considerations in Geriatrics."

Editor Donaldson of Pennsylvania was much pleased with the paper and quotes freely from it.

THE 1952 MEDICAL CARE DOLLAR

The Bureau of Medical Economic Research has recently published another item in its series on personal consumer expenditures for medical care based on data recently issued by the United States Department of Commerce. Total personal consumer expenditures for all goods and services rose from 208 billion dollars in 1951, to 218 billion in 1952. The medical care portion increased from 9.0 billion dollars to 9.6 billion dollars, from 4.3 per cent to 4.4 per cent of the total; an unknown portion of this increase was due to the large number of births. The physician's share of the personal consumer dollar spent for medical care decreased from 28.1 cents to 27.8, while the hospital's share rose from 24.0 cents to 24.8. Thus the data for 1952 indicate a continuation of the long trend downward for the physician's share and upward for the hospital's share. The dentist's share also declined slightly.

On the basis of these data and other data published by the United States Department of Labor, this study reports that in 1952, as in 1951, 54 per cent of an average week's wages of production workers in manufacturing industries was required to purchase the same amount of medical care and drugs that would have required an entire week's wages in the base period 1935-1939. The corresponding percentage for physicians' services was 50 in both years.—Editorial, *The Journal of the American Medical Association*, August 22, 1953.

HOW TO BECOME A MOSS-BACK

Younger members sometimes grumble that our society is controlled by entrenched moss-backs—a clique of medical politicians.

This criticism does not appear to be based on fact. Of the current officers, barnacle-encrusted President Ralph A. Johnson, age forty-seven years, is the oldest. For the secretary and president-elect, Life Has Just Begun. As for committee membership, a survey reveals that reappointments correlate well with the previous year's attendance and work

record. Members, able and willing to work, are utilized again and again. Inactive members are quietly replaced.

What the grumble about moss-backs usually indicates is frustration: the grumbler would like to play a more active role in the society, but, modest, relatively unknown, and proud, he does not know how to get started. He knows he has good ideas; he is willing to work; failure to be assigned a job in the society must represent a sinister hunger for power by the entrenched moss-backs—the clique of medical politicians.

It is not difficult for a member to become active in society affairs. *First*; the younger member should make himself known to his colleagues in the society. This can be accomplished by participation in both scientific and social activities. On the scientific side, he may participate in the programs of his Branch Society, the Central Medical Society, and even in those of the County and State Societies. On the social side, he should attend some of the Monday Night Dinners preceding the regular scientific meetings of the Wayne County Medical Society. Recommended also is participation in the society sponsored bowling and golf tournaments, and attendance at the President's Ball. Friends are easily made at these affairs. *Second*, if he is willing to participate in committee work on any of the more than forty committees of the Society, he should apprise the President-Elect of this willingness. Committee work is an excellent introduction to understanding the mechanics of operation of the Medical Society. *Third*, the younger member also has access to the Letter Box of the *Detroit Medical News*. Here he may record his ideas and constructive suggestions for consideration by the membership. Only "Rant and Rave" is more widely read than "Letters to the Editor."

By following these precepts, younger members will quickly become active participants in society affairs. They will learn how the society operates, will contribute vigorous ideas and vitality to its strength, and will derive wisdom and judgment from the counseling of their older colleagues. And then, one day, they may discover that, by some weird alchemy in the caldron of experience, they have been transmuted (more's the pity!) into moss-backs and medical politicians.—MILTON R. WEED, Editorial in *Detroit Medical News*, August 24, 1953.

Some patients have conscious or unconscious feelings of guilt and assume that the cancer is punishment for their guilt.

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Obesity: Key to the Prevention of Diabetes

By William H. Olmsted, M.D.
St. Louis, Missouri

THE PROOF of the existence of the large number of unknown diabetics in this country has stimulated the medical profession to study ways and means leading to their discovery and treatment. Important as diabetes detection is, it presupposes the occurrence of diabetes but does not attempt its prevention. This paper briefly summarizes the facts that prove obesity the most important factor in the etiology of diabetes. The widespread presence of the recessive gene for diabetes in the population would be extremely difficult to eradicate. On the other hand, obesity is quite vulnerable to educational attack.

The relationships of obesity to diabetes will be considered under four headings: (1) Hypernutrition requires the secretion of large amounts of insulin; (2) Clinical facts prove that obesity precipitates and aggravates diabetes; (3) Experimental obesity predisposes to diabetes; and (4) Mortality statistics emphasize the etiological importance of obesity.

Insulin Requirements and Obesity

The functions of insulin are but partially known. In general, one can say that insulin augments the following physiological mechanisms: (1) The formation of glycogen in liver, muscle and other tissues; particularly its formation in adipose tissue.³¹ (2) The oxidation of glucose. (3) The formation of fat from glucose. (4) The anabolism of proteins. These processes are brought about by enzymatic reactions and there is evidence to

show how they are brought about. First, insulin speeds up the phosphorylation of glucose. This step is necessary for all the above functions. Secondly,⁸ it makes possible the use of two carbon fragments to build up fatty acids and probably proteins also. Glycogen²⁸ can be formed after phosphorylation by conjugation, or it can be formed from two carbon fragments. In the latter instance insulin is not required. Schoenheimer²⁵ first showed clearly by the use of deuterium that fat is formed constantly from carbohydrate and not as formerly believed only when calory intake exceeded output. Thus the amount of fat formed from carbohydrate determines to a large extent the insulin need. Stetten^{26,27,28,29} and others^{3,20} have shown that much more carbohydrate goes to form fat than to form glycogen. This is true even when the animal's weight is stationary. When fat is being accumulated the insulin need is at its maximum. On the other hand, when the animal is starving and mobilizing his body fat for fuel, no insulin is needed for that process. By the analyses of rat pancreases for insulin, Haist¹³ in Best's laboratory showed that the beta cells rested during starvation and when a high fat diet was fed. Thus dietary fat probably does not require insulin to be oxidized or stored; however, the diets consumed by those gaining weight consist usually of at least 50 per cent carbohydrate. Not only is the need for insulin increased by the formation of fat from carbohydrate but as weight is gained and the basal calories increase the need for insulin increases to support the increased metabolism. If the process is reversed with an intake of fewer calories than needed, insulin need is greatly decreased because less fat is being formed from carbohydrate and the basal calories are lowered as the body decreases in size.

OBESITY: PREVENTION OF DIABETES—OLMSTED

TABLE I. RELATIONSHIP OF DIABETES TO OBESITY
IN THE POPULATION PAST FORTY YEARS OF AGE

Known Diabetics	Unknown Diabetics	Total Diabetics	Diabetics 20 per cent Overweight	Population 20 per cent Overweight
850,000	900,000	1,750,000	875,000	4,000,000

Obesity and Diabetes: Clinical Facts

Frederick Allen, forty years ago, first proved experimentally the favorable effect of under-nutrition and conversely the detrimental effect of overnutrition on diabetes. Today authorities will agree to the principle of the initial reduction of all overweight diabetics. Reducing weight to normal in the obese diabetic may, as Newberg and Conn²² showed, change the sugar tolerance curves from a high sustained one to the normal type. In the case of the diabetic receiving small amounts of insulin, he will be able to do without it and even if larger amounts are required before reduction, only a small dose, or none, will be needed afterward. There can be no doubt that reduction of weight rivals insulin in its therapeutic import.

Joslin¹⁶ has shown that obesity precedes diabetes in 85 per cent of the cases. This is true after the age of forty. And most important is the fact that 50 per cent of men and 60 per cent of women are 20 per cent overweight. Armstrong,¹ et al, estimate there are five million people over the age of thirty who are 20 per cent overweight in this country. Of these, four million are past forty years of age. There are eight hundred and fifty thousand known diabetics past forty, and an estimated nine hundred thousand *unknown* diabetics in this age group. These facts are summarized in Table I.

Of those 20 per cent overweight and past the age of forty, one out of nine is a known diabetic and one out of four or five is a known or unknown diabetic.

Not only are these figures significant from the standpoint of etiology, but they are of invaluable help in the detection of the unknown diabetic.

Experimental Obesity and Diabetes

Within the past ten or more years the production of obesity in animals has been accomplished. Three methods have been demonstrated: (1) Forced feeding through a tube¹¹; (2) Injury to the ventrolateral and ventromedial nuclei of the hypothalamus in the rat, cat, dog and man;^{4,5,6,7,9,14,23} (3) Breeding of genetically obese mice.^{2,12,15,17,18,19}

Overnutrition is common in man but laboratory animals as a rule are less likely to overeat, unless forced fed. Engel¹¹ et al produced obesity on rats by tube feeding. These rats became temporarily diabetic, if in addition to the forced feeding they were injected with both the growth and adrenocorticotrophic hormones. The islets of these animals were hypertrophied but even so their insulin apparatus was overwhelmed, in presence of overnutrition and the diabetogenic hormones. The islet tissue of dogs, cats and man do not hypertrophy under these circumstances and in them obesity is more diabetogenic.

Hetherington¹⁴ ten years ago proved that injury to the hypothalamus could be followed by obesity and that this condition was unrelated to pituitary lesions. For one hundred years the so-called Fröhlich syndrome had been confused with the disease of the pituitary. Brobeck, Tefferman et al^{4,5,6,7,9} in Long's laboratory have studied the relation of this form of obesity to carbohydrate metabolism. They brought out the following facts: Hypothalamic obesity is due to hyperphagia. The rats ate continuously and gained rapidly. No other explanation of the gain in weight except increased caloric intake was found. The basal metabolism was normal. The R.Q. of the obese rats was well above one, proving that carbohydrate was very rapidly converted to fat. The Yale observers proved that the conversion of carbohydrate to fat was an acquired metabolic adjustment to stuffing the body with carbohydrate and forcing the organism to store it in a limited period of time. Normal rats, they found, could be trained to eat a whole day's food in an hour's time. These trained rats, like the hypothalamic ones, converted carbohydrate rapidly to fat. Furthermore, it was shown that the conversion of carbohydrate to fat took place in both adipose tissue, as well as the liver, but the trained rats had higher amounts of fat in the liver than the controls. Partially depancreatized rats are not diabetic but if such animals are made obese by producing hypothalamic lesions, they become so. Fasted, the glycosuria and hyperglycemia cease, only to return when the animal is allowed to stuff himself with food. One hypothalamic rat became permanently diabetic without pancreatectomy and two others showed diabetic blood sugar curves. Ranson²³ has produced hypothalamic obesity in a monkey.

The work at Yale suggests that in man large meals habitually eaten force the rapid conversion

of carbohydrate to fat. The beta cells of the islets are called, upon to produce large amounts of insulin in short periods of time. In the course of time the exhaustion of the islet cells occurs. Fat formation is a means of controlling hyperglycemia just as is the formation of glycogen.

The third form of experimental obesity of great interest is the genetically produced mice.¹⁵ A strain called "V" was crossed with one called "Fuzzy" and of the litter mates approximately 20 per cent overate and rapidly became obese. The gene is recessive and unfortunately the obese animals are sterile. Mayer et al^{2,12,17,18,19} have studied these animals. They are diabetic. The blood sugar is high and cannot be reduced by insulin, in fact several times the lethal dose is well tolerated. Nevertheless the blood sugar falls promptly when the animal is starved. The basal metabolism is very low, over 40 per cent below controls. But the thyroid gland is microscopically normal. The islets are hypertrophied and are more numerous than normal. The beta cells are normal. The liver contains only a trace of stainable glycogen in contrast to the abundance of glycogen stained in the livers of controlled animals. Guggenheim and Mayer¹² injected these animals with radio-active acetate and pyruvate and showed that these substances were stored rather than oxidized.

These mice are probably diabetic because they cannot form liver-glycogen. They apparently do not suffer from insulin deficiency either absolute or relative, judging from the stained pancreas preparations. In two respects the animals suggest an explanation of the insulin-resistant obese diabetic. If such diabetics had difficulty in forming liver glycogen as the mice do, we would have an explanation of their insulin resistance. Secondly, the hereditary combination of obesity and diabetes makes one wonder whether human obesity is a hereditary trait accompanying diabetes. Such may be the case, but as yet there is no evidence to prove it.

Statistical Data Bearing on the Obesity-Diabetes Relationship*

Death rates may or may not reflect morbidity rates. If diabetes death rates are truly and reliably reported by the medical profession, and if

the old fifth Revision of Causes of Death were used, there would be a better relationship between mortality and morbidity. Granted that mortality statistics only crudely reflect morbidity rates, they are worth studying to determine if the state of nutrition of a nation is reflected in the diabetes mortality rate.

Before doing so, one must keep in mind at least three conditions that have profound effects on diabetes mortality rates: (1) The rules in force governing the classification of causes of death; (2) The availability and quality of medical services; (3) The age of the population and the sex ratio, especially over the age of forty-five. Dublin and Marks¹⁰ compare the mortality rates of the states as they appear under the fifth and sixth Revisions of the International List of Causes of Death. The rate classified by the sixth Revision varies from less than .30 to .80 of the fifth Revision. The ratio variation probably illustrates the variation in reporting of diabetes by physicians and the availability of medical service. The sixth Revision allows the physicians' opinions more weight and leaves to them the decision whether the complications of diabetes which kill are to be given preference over diabetes as causes of death. These data suggest that in the United States rates which do not vary more than 50 per cent are not significant for reasons stated above.

One of the interesting features presented by Dublin and Marks¹⁰ is the variation of death rates in the large cities of the United States. They present the rates of the fourteen largest cities. Rates (1948) varied from New York with 48.2 to San Francisco with 26.5. Also they show that in nearly thirty years in some cities the diabetes death rates has doubled and in others it has increased very little. The explanation of this variation is the shift of population as regards age and sex. The greater numbers of those past fifty years, and especially if the city contains many older women, the higher will be the diabetic death rate.

The discussion of diabetes death rates in this country is to emphasize the importance of the factors discussed, namely, the availability and quality of medical service, the laws in force governing the classification of causes of death and the age and sex ratio of populations. If in one country such as the United States, morbidity rates vary so widely, one must be very cautious indeed in comparing those of various nationalities. Never-

*The author is indebted to Mr. Herbert Marks, Metropolitan Life Insurance Company, for his criticism and help.

theless, we know that war has brought about large changes in the levels of nutrition in the several countries of Europe. If the level of nutrition effects diabetes morbidity rates, as we think it does, there should be changes in the rates in Europe corresponding to changes in the national level of nutrition. Unfortunately vital statistics are not reliable for just the time one wants most, for instance during 1942 to 1945. However, we have reports from physicians that can be relied on.

During 1941-43 there was starvation in Greece with calorie intakes of approximately 1,000 calories. The mortality from diabetes was almost nil.³⁰ In the Scandinavian countries H. Malmros²⁴ reported that during 1935-45 the mortality rate from diabetes reached the lowest level of the decade and the clinic cases dropped to 1,880 (twenty-two clinics) and then rose to 2,640 in 1946. The same trend was seen in the Netherlands, England and Germany.

Diabetes death rates in most European countries, as shown by Dublin and Marks,¹⁰ are dropping. They compare the rates of 1928 and 1938 with those of 1948. Whereas, the rates in the case of United States, Canada, Australia, New Zealand are rising, those of most countries of Europe are falling. The relative rates of some of the nations given by Dublin and Marks¹⁰ are:

U.S.A.	26.4	Germany	7.7
Canada	20.3	England & Wales	*7.6
New Zealand	20.1	France	7.3
Australia	18.8	Netherlands	7.4
Denmark	16.6	Italy	6.9
Belgium	15.9	Sweden	6.8
Norway	12.3	Finland	5.9
Switzerland	11.2	Austria	5.6

*Not comparable.

These authors say: "Unfortunately the facts on which one can judge the significance of these sharp declines in diabetes death rates in Europe are not available. Nevertheless there is ground for the belief that the trend of diabetes mortality rates affords a practical demonstration of *diabetes control* (italics ours) on a large scale by enforced dietary restriction.

"In contrast countries which have experienced an increase or little change in diabetes mortality, such as United States, Canada, Australia and New Zealand, have enjoyed an abundance of food, so that in part, at least, their death rates reflect high living standards and high food intake." We are convinced that if data of the number of people

20 per cent overweight were available, a clear-cut relationship to diabetes would be found.

Discussion and Summary

There is good physiological-pathological facts to support the thesis that overnutrition throws enough strain on the insulin apparatus to cause it to break down as either an actual or relative insulin deficiency. This is true of the cat, dog or man. From a clinical point of view, reducing obesity is a therapeutic means in some cases as effective as insulin. The fact that obesity precedes the onset of diabetes in 85 per cent of individuals past forty years of age, and the further fact that of all pathologically obese individuals (20 per cent above normal weight) one out of five is diabetic, all these clinical facts support the role of obesity as of great etiological importance.

The evidence from the study of experimental obesity proves that there is a biochemical pathological relationship between obesity and diabetes. Hypothalamic obesity has been shown to place a strain on the insulin-producing cells, and diabetes has developed in monkey, rat and man. Genetic obesity in mice with diabetes is of interest because of the block existing to the formation of liver glycogen. Newburgh in 1939 proposed that in the case of the elderly obese diabetic just such a block existed. Further interest in these animals lies in the fact that the insulin apparatus seems to be, at least histologically, in better than normal condition and yet diabetes exists. One waits with interest the determination of insulin in the pancreases of these animals. This new form of obese-diabetic animal will throw fresh light on the understanding of obesity and diabetes and their relationship.

Granted that statistics cannot be taken at their face value and require careful interpretation, nevertheless, one is inevitably attracted to their study because they can tell the story of vast experiments in human nutrition. In our generation wars have brought well nourished nations to starvation followed by resuscitation. The evidence seems to show that the mortality and morbidity rates decrease with undernutrition and increase with overnutrition. Those nations which have low levels of nutrition have low diabetes mortality rates, while prosperous nations with hypernutrition and resulting high incidence of pathological obesity have very high rates.

Taking the evidence presented one is forced to conclude that obesity is as important as heredity in the etiology of diabetes. True, many (one third, all ages) diabetics are not overweight, but the evidence of war undernutrition proves overnutrition has a greater influence on diabetes mortality than heredity. Perhaps one would better say that the hereditary diabetes, because it is recessive, will not become apparent unless overnutrition be present, at least in the greater majority of cases, and particularly in the later years of life.

How can the chronic state of overnutrition in the United States be reduced to normal level? First, by more research to reveal the nature of hunger, appetite and satiety in the experimental animal and especially in man. Secondly, an educational campaign based on prevention rather than cure. Such a campaign could interest health agencies such as The American Diabetes Association and other organizations concerned with national health as it is affected by overnutrition.

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Obesity: Clinical Observations

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AS A RESULT of clinical observations certain impressions have been made concerning the problem of obesity. It is commonly accepted that obesity is the result of so-called "luxus" consumption of food that is required for energy requirements. The statement that fat only comes from food is true but why do some individuals who put on weight easily find it extremely difficult to diet, and regain the weight that was lost as soon as dieting is halted?

There is no question but that heredity plays a large role in the production of obesity. One needs but take the family history of obese individuals to determine the hereditary factor. There is no reason to believe that fat tissue reacts differently to hereditary factors than do the bones, muscles or other tissues. Furthermore identical twins in different environments react the same to food intake.

It is agreed that the obese individuals consume an excess amount of food. But what gives these individuals such large appetites? Listening to these obese individuals one is impressed by the intense craving for food simulating in a measure the craving for alcohol. All the good resolutions made to follow a reduction diet are so frequently thrown overboard when the craving for food overtakes them and they soon return to the so-called "knife and fork league." Over the period of years I have watched and listened to obese individuals give their reasons for overeating. Of course most of them deny they do this, some are honest about it and frankly say they overeat but cannot help themselves.

Craving for food in obese individuals, is in a large measure, due to inheritance. They inherit an increased appetite. Certain observations make me believe that there is a glandular background for this craving. This is not offered as an excuse for obesity since it is agreed that fat comes only from food. It is said hiding behind a glandular

explanation eases the obese individual's conscience so that in this way he justifies his great appetite and food consumption.

From what I have been able to observe the explanation for the craving could be found in an overactive pituitary gland and the neighboring hypothalamus which act as a pacemaker for carbohydrate metabolism. The overactivity of the pituitary-hypothalamic system results in stimulation of the pancreatic islet cells with production of insulin, this in turn lowers the blood sugar and activation of the appetite center (probably in the hypothalamus) resulting in a craving for food. It is similar to the parental injection of insulin which results in hunger. As we know when the blood sugar level is lowered by insulin one of the first symptoms noticed by the patient is a craving for food. Such craving is not to be denied and nature creates this craving to overcome the hypoglycemia. Overdosage of insulin results in marked mental disturbance with confusion, irritability, extreme restlessness, and mania. If the blood sugar is reduced to very low levels convulsions may be induced. It is of interest that the convulsions are a protective mechanism to release glycogen from the muscles and thus overcome the hypoglycemia and convulsions.

The ability to induce obese children to diet has been, as a general rule, a dismal failure in my experience. Even with anorexic drugs I have had no real success. When the drugs are discontinued the same craving for food returns often with a vengeance so that the weight returns in a hurry and not infrequently exceeds the pre-drug, pre-dieting period. Unfortunately some obese persons consume the diet plus the regular meal.

There are some strong willed obese patients who are determined to lose weight. Being humorously referred to as "fatty," "tubby" and other such names goads some of them to strenuous dieting with real success. Children are particularly cruel to one another in that having no inhibitions they nickname their playmates with scurrilous appellations. Their nicknames are also applied to crippled and deformed children. Of course these nicknames are considered harmless by the children but do make a deep impression on the recipients. Women are more apt to follow a diet than men since their attractiveness is often lost by obesity. Of course psychological factors enter into dieting and when the obese individual does lose a few

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pounds he is encouraged to continue the diet, particularly if his health improves.

The intense interest in overcoming obesity is seen daily in magazines, especially those devoted to women's fashions. Every type of diet has been advocated and all fall by the wayside. The Hollywood, banana, high protein, yogurt, and the countless variations each have their champions and each have their day in the limelight only to sink into oblivion within a short time. The individual returns to his ancestral type until a new diet sponsored by bridge club friends is given a trial. One can't help but feel that Shakespeare knew body build and character when he said—

"Let me have men about me that are fat:
"Sleek-headed men, and such as sleep o' nights:
Yond 'Cassius has a lean and hungry look;
He thinks too much: such men are dangerous."

Kretchmer¹ in more recent times also pegged the various mental types in his book *Body Build and Character*. He showed that the greatest percentage of fat people if they developed insanity were of the maniac-depressive type whereas the thin, slender type developed schizophrenia—the fat type committed suicide (seen in the Germanic races) and the lean type committed homicide.

The endocrine system is responsible in a large measure for body build, that is individuals inherit their glandular activity and the target tissues reaction to glandular secretions. That the pituitary plays a role in obesity is seen in pituitary basophilism and acromegaly. In both conditions, the sugar tolerance is low. Furthermore, anterior pituitary extract can produce a permanent diabetes mellitus. Of interest is the fact that Cortisone, ACTH and Testosterone usually increase the appetite with a gain in weight and a lowered sugar tolerance.

It is known that hypothalamic lesions such as P. E. Smith² produced in rats by the injection of chromic acid resulted in marked obesity whereas the control rats on the same diet did not behave in this manner. Furthermore the individuals who suffered from encephalitis lethargica frequently became extremely obese much like the rats with hypothalamic lesions. It is well known that infections, such as measles, scarlet fever, and others may be followed by obesity. The fact that there is frequently a spurt in growth following these infections would indicate that the hypothalamic-hypophyseal mechanism is activated. Likewise the

removal of tonsils activates the mechanism so that there is an increase in height and weight in predisposed individuals, that is, if by hereditary background they are to become obese, infection, puberty, tonsillectomy may act as the priming mechanism. It is readily understandable that the temperature regulating mechanism of the hypothalamus is activated by infection and also by conditions of stress which Selye has brought into such great prominence. This may lead to obesity. One may also mention the changes in this mechanism at the menopause and pregnancy which frequently set off the priming mechanism for obesity. So often individuals complain of the "middle-aged spread" and it is very distressing. They follow the hereditary pattern at this time and the menopausal symptoms vary with individuals. Some have absolutely no menopausal symptoms such as hot flashes, mental depression, or paresthesias, while others suffer a great deal.

The close relationship between fat metabolism and the hypothalamic-hypophyseal mechanism is seen in Simmond's disease or pituitary cachexia. In this disease there is practically a complete disappearance of fat from the body and the individual presents a picture of extreme emaciation. A clinical condition simulating it in practically all its characteristics is anorexia nervosa which presents a difficult diagnostic problem. This condition is due to psychic causes so that the individual loses the appetite almost completely. Some who are under stress or mentally depressed, may eat excessively and still lose weight and when the offending cause is removed, they again gain weight rapidly.

The fallacy of giving thyroid to an individual because he is obese has been emphasized.² It has been pointed out that few individuals are really suffering from hypothyroid obesity. Furthermore the basal metabolic rate is not the diagnostic criterion for these individuals. Some physicians are prone to treat the metabolic rate instead of the patient. It is known that pituitary-hypothalamic disturbances produce a lowering of the basal metabolic rate. Giving obese children thyroid in fairly large doses such as one to three grains for reducing purposes is not without danger for prolonged overdosage may result in medicated hyperthyroidism with a *negative calcium balance*. This results in osteoporosis, such as seen in thyrotoxic

(Continued on Page 1067)

Control of the Diabetic

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DESPITE the advances in our knowledge of diabetes, the average physician is still beset with some doubts as to how to proceed with the management of the patient with this disease. One of the difficulties arises from the overemphasis on the chemical aspects of the disturbed metabolism, with little consideration for the patient who must adapt himself to a radical change in his mode of living. Others are concerned with the planning of a proper diet; when to give insulin and the kind to be used; how often to see the patient and the minimal tests to be done; how rigidly to maintain control; and what measures to take when the daily schedule of the patient is disturbed by acute illness.

Before embarking on the technical aspects of effective control it is important to recognize that the patient is usually a reluctant, skeptical and frightened person who is faced with what to him is a radical change in his former method of living. Often his discomforts are few and not immediately threatening so that he tends to consider them unworthy of so much corrective effort. It is thus no small task to convince him to change his ways and to develop an objective approach to the solution of his problem. Painting a threatening picture in full color of all the dire consequences that may befall him is to start off on the wrong foot. Adding fear paralyzes positive action and may drive the patient into hiding or into the hands of the charlatan.

A friendly approach during which there is an understandable explanation of the problem will make the way easier for both doctor and patient. It should generate enthusiasm, for this is a disease that offers many immediately evident gains against the few remote possibilities of damage. Unless the patient is properly convinced in the beginning, honest co-operation will be lacking and what should be an open joint effort degenerates into a game of "fool the doctor."

Furthermore it must be impressed on the patient that while the diet is the sheet-anchor of treatment this means only that the quantity, not necessarily the quality, of the food he eats is to

be modified, and before arranging a suitable diet it is important to have an exact dietary history so that the eating habits and tastes may be learned. At this point it is useful for the doctor to classify, at least roughly, the type of diabetes that presents. Juvenile diabetes and that of the aged are two different diseases. In the former there is primarily a lack of insulin, in the latter there is slowing in the cycle of carbohydrate metabolism and possibly some impairment in resorption and excretion. The middle-aged diabetic, while producing insulin at a normal rate, often develops his disease after a period of obesity and has varying degrees of liver damage.

Arranging the Diet

Shall one start with a diet and insulin at once or with diet alone? In the middle-aged and older diabetic it is wiser to temporize as to insulin while in the junior diabetic it is a foregone conclusion that insulin will be needed. In any case, unless the situation is urgent, a trial of dietotherapy alone is reasonable, if only to emphasize its basic importance.

Calculation of the diet should be made with respect to the needs, not the wants, of the patient. At this point it must be decided by the doctor whether he will allow his patient to eat what he wants, taking up the slack with insulin, or whether he will insist on subjugating the patient's tastes and having him adhere to a fixed diet to meet his needs. The latter method is less troublesome in the long run since it allows but one variable factor to enter, that of insulin, if it is needed. The first method introduces two variables, permits two people to tamper with the controls and results in inadequate, irregular, unreliable control.

Calculation of the diet formula is relatively simple. The total daily caloric need is first determined by taking into account the age, sex, optimal weight and occupation. The adult needs 30 calories per kilogram; children from fourteen to seventeen years, 60 to 40 calories; those from ten to thirteen, 70 to 60 calories; from six to nine, 80 to 70 calories; and from two to five, 90 to 80 calories. Protein requirements average 1 gm. per kilogram for the adult, and 2 to 4 gm. for infants and children. The trend of late has been towards higher protein increments for the more severe diabetic at the expense of the carbohydrate fraction since the former provides carbohydrate at a slower more uniform rate.

CONTROL OF THE DIABETIC—REVENO

The carbohydrate allowance varies from 2 to 3 gm. per kilogram, while the balance of the caloric requirement is met by fat with its value of 9 calories to the gram. Thus the diet prescription for a man weighing 150 pounds (70 kg.) will provide 2,100 calories from 70 gm. protein, 140 gm. carbohydrate and 140 gm. fat.

Translating the diet prescription into a palatable menu probably constitutes the most troublesome obstacle for both patient and physician. Here the individual's tastes, dietary habits, hours of work and family co-operation must be accorded consideration. The problem can probably be handled best with the aid of a hospital dietitian. Lacking this facility, simple menus for most dietary prescriptions are available in text books on diabetes and are quite satisfactory in most instances. But instruction must be clear-cut with no doubts left in the patient's mind as to food values, substitutions and the need for strict adherence to the diet. The reluctance of the patient to change his former habits and the vagueness of the advice offered by the physician promote carelessness in carrying out this most important single aspect of successful management. This is the keystone of the whole structure and the patient must be given complete and detailed understanding of what the diet means to him.

A method that may be used to drive the lesson home is to start the diabetic who is not in acidosis on the following diet that allows 112 gm. carbohydrate, 64 gm. protein and 32 gm. fat yielding 1,000 calories:

Breakfast

- 1 serving fruit
- 1 egg
- ½ slice bread
- ½ tsp. butter or margarine
- coffee or tea

Lunch

- 1 cup broth or bouillon
- 1 average serving lean meat, fish, fowl or cheese
- 4 servings vegetables
- 1 serving fruit
- ½ slice bread
- ½ tsp. butter or margarine
- 1 cup skim milk

Dinner

- 1 cup broth or bouillon
- 1 average serving lean meat, fish, fowl or cheese
- 2 servings vegetables
- 1 slice bread
- ½ tsp. butter or margarine
- coffee or tea

This serves several purposes. By underfeeding, it promotes weight reduction when this is necessary and effects better utilization of the ingested food.

It is often surprising to find the severe diabetic who is undernourished becoming aglycosuric and even gaining some weight under this regime. Furthermore it introduces an abrupt break with former eating habits and teaches tolerance for hunger. Instruction in urinalysis should be given at this time and the patient asked to return at weekly intervals when adjustments in the diet are to be made and the need for insulin determined.

In the obese, weight loss is desired so no increase in the diet should be made. The use of insulin in these patients should be deferred as long as possible to allow the effect of weight reduction on the diabetes to assert itself.

A waiting game is also indicated in the aged for these do not require a high caloric intake and rapid elimination of the glycosuria is not always urgent.

In the juvenile, brittle, or middle-aged undernourished diabetic, however, an optimal diet should be reached as soon as possible and insulin added to assist in its utilization. Here, as well as in the aged, one may start with a dose of 10 to 15 units of protamine zinc insulin before breakfast, adding 5 units daily at weekly intervals until the glycosuria has cleared. In the severe diabetic this goal can be reached only occasionally and it will be necessary to add crystallin or globin insulin later in the day when the glycosuria is most pronounced. Adjustments in dosage of protamine zinc insulin should be made according to the glycosuria in the prebreakfast urine specimen. A continuing negative finding indicates a reduction in the dose by 4 to 5 units while persisting glycosuria calls for an increase by a similar amount.

When more than one type of insulin is necessary urine specimens are best checked on arising, before lunch, dinner and at bedtime and the shorter acting insulin administered in advance of the midday or early evening glycosuria. Here again changes up or down should be made in increments of 4 to 5 units and rarely oftener than once a week. When effective doses of slow and fast insulin have been established the two may be combined by administering the total unitage as a mixture of 2 parts of crystalline and 1 part protamine zinc or as NPH insulin.

The patient should be seen at weekly intervals during the period of adjusting the diet and insulin. Once this has been accomplished, the interval may be lengthened to four weeks and even

CONTROL OF THE DIABETIC—REVENO

longer, depending on the degree of understanding and co-operation attained. At these visits the patient should report on his well-being and present his daily record of urinary findings. If his weight remains at the optimal level, the midafternoon blood sugar value is not over 150 mg., and he has been reasonably aglycosuric, he may be considered well controlled and no change need be made in his program. Weight loss alone may mean insufficient caloric intake. When combined with persistent glycosuria insulin dosage is inadequate. Weight gain with glycosuria generally means extra food is being taken and it is best not to increase the insulin dosage but to insist on strict adherence to the prescribed diet. It is unwise to charge the patient with cheating or to engage in prolonged arguments to prove his errors. The findings should be thoroughly explained and allowed to speak for themselves. Co-operative effort is in the final analysis, the only way in which adequate control may be attained.

What is Adequate Control?

What constitutes adequate control? This question has been tossed around considerably in the past several years and while at the moment the conservative view of strict aglycosuria and normoglycemia appears to prevail, it must be admitted that this is more wishful than practical. The liberal view that allows an unrestricted diet with a moderate dosage of insulin and has scant regard for the amount of glycosuria so long as the patient gains or holds his weight and feels well, is altogether too practical. It has the doubtful advantage of relieving both patient and doctor from concern about the disease but only differs from the old time empirical management of diabetes by substituting a little insulin for the "go easy on the starches and sugars" admonition. Nevertheless it has brought the issue into the open and has demonstrated that, however desirable, rigid control is an ideal more talked about than accomplished.

One wonders whether the effort to achieve perfection is not too costly in view of the gains made; whether the personality of the juvenile diabetic for whom perfect chemical control is most ardently sought will not be warped in the devotion to so demanding a cause. If diabetes meant only an insufficient insulin supply there would be no problem. But variable factors, more numerous in

the young person, make it exceedingly difficult, if not impossible, to achieve and maintain complete aglycosuria and normoglycemia.

Too rigid control also introduces frequent episodes of hypoglycemia which, besides fear and discouragement, may cause damage to the brain and diminution in the coronary circulation. Generally, with a suitable restricted diet as a base, and allowance made for the hypoglycemic effect of muscular activity, enough insulin should be administered to keep the post-prandial urine as nearly sugar free as possible and the post-prandial blood sugar level no higher than 150-160 mg. per cent.

Frequency of Observations

As mentioned earlier, visits to the doctor should be made weekly until the diet has been established and insulin dosage determined. After that the interval may be lengthened to from four to six weeks. The patient should bring a record of his daily urinalyses to demonstrate adherence to the diet and the adequacy of insulin dosage. An honestly kept record will disclose much of value both to patient and doctor. Among other things it will point up periods of emotional strain and dietary deviations when control is lost, thus offering opportunity for discussion of the problems arising since the last visit.

A record of the weight and blood pressure and the state of the eye grounds and peripheral vascular circulation complete the essential clinical observations.

Factors That Disturb Control

Occasionally the patient who is well controlled has an acute upper respiratory or other type of infection with fever, or he suffers a gastrointestinal upset with nausea and vomiting or diarrhea during which his dietary schedule is disrupted. In such instances it is important to continue insulin even though food is not being taken and the patient must be assured that there is no risk in following this advice. Fluids, particularly water, must be taken until the doctor is reached and better arrangements can be made to control the disturbance. Prompt medical attention cannot be emphasized too strongly for it is here that diabetic acidosis and coma have their beginning.

CONTROL OF THE DIABETIC—REVENO

Summary

Control of the diabetic is best achieved through a smoothly functioning partnership between physician and patient, the former as director and guide and the latter as the field worker. A thorough knowledge of the aims and objectives must be instilled in the patient and enthusiasm constantly stimulated to override any discouraging obstacles as they arise.

An adequate, readily available diet that is adjustable to meet the variables in the patient's everyday existence is of basic importance.

Sufficient insulin of suitable type should be supplied when indicated and the syringe used, as well as the dose, should be checked by the

physician. Regular meetings between patient and doctor should be arranged to determine the effectiveness of the program and to discuss jointly problems of management.

Criteria for adequate control should be set up eliminating extremes in reaction so that the patient's daily pattern will simulate closely that of the non-diabetic.

Precautions to be observed when the customary routine is disrupted by illness must be clearly defined.

Chemical control alone is not enough. The patient is not a test tube and his metabolic problem requires personal study and mutual understanding.

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OBESITY: CLINICAL OBSERVATIONS

(Continued from Page 1063)

osteoporosis. A consequence of this, since these individuals are heavy, is a curvature of the spine and if medication is prolonged irreparable damage is done.

Many obese patients, after varying periods of trials with various diets develop their own philosophy such as, "Let the chips fall where they may," or some who are more forceful say: "To hell with it" and merrily go on their Fallstaffian way. Now and then one is encouraged by the weight loss achieved by some obese patients with determination and the help of anorexic drugs. An understanding physician or psychiatrist is of assistance in these cases and some patients continue their diet indefinitely. More frequently, however, the larger number who do not diet and, of course do not lose weight, put a damper on the physician's enthusiasm. All in all obesity is a problem that is difficult to treat and regardless of what viewpoint one takes a reduction diet is still the only way to lose weight. One cannot help but sympathize with the individuals who say "would that this too too solid flesh would melt."

Summary

Obesity is the result of luxus consumption of food but the view is taken that heredity plays a large role in the production of obesity. Fat tissue reacts no differently to hereditary factors than do other tissues. It is assumed that the excess food intake is brought about by a large appetite which may well be due to hereditary overactivity of the pituitary-hypothalamic system. A lowered blood sugar similar to that seen in overdosage of insulin, may be the factor producing the large appetite.

The pituitary-hypothalamic activity with resultant stimulation of the pancreatic islet cells could produce hypoglycemia with resultant hunger.

The treatment for obesity regardless of the cause still remains a low calorie diet.

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Diabetic Coma and its Treatment

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IT IS THE purpose of this discussion to provide a brief clinical review of the treatment of diabetic acidosis and coma. Such aspects of the problem as symptomatology, diagnosis, frequency, mortality rates, et cetera, will not be considered. Considerable emphasis will be given to certain recent advances in therapy which have emerged from a better understanding of the physiologic processes involved in the development of this state of acidosis. Many patients, of course, will recover from diabetic coma in spite of rather haphazard treatment with saline solutions and insulin. However, there is little doubt that many other patients, who either do not survive or develop serious complications during treatment, could be spared if more consideration were given to some of the finer details of management.

The initiating, primary cause of the ketonemic acidosis in diabetics is the rather abrupt development of a serious impairment of the tissue to utilize glucose to satisfy energy requirements. This marks the extreme diabetic state and initiates a whole series of metabolic events which finally culminate in coma. The precise reason for the sudden deterioration in ability to utilize carbohydrate is not known. However, intercurrent infections or trauma, or withdrawal of insulin often precipitates the development of this state. Because of its occurrence much larger amounts of insulin than normally required are necessary to effect accelerated utilization of glucose. Thus a state of relative insulin ineffectiveness exists. Some of the complicated consequences that lead to the development of, and characterize diabetic coma are outlined below. Treatment is designed to cause a prompt cessation of the progression of these events and to reverse many of the processes, so that normal composition and function of body fluids and tissues are attained.

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1. A serious inability to utilize glucose; characterized by a relative insulin ineffectiveness.
2. Continual rapid breakdown and depletion of liver glycogen—→ hyperglycemia—→ glycosuria with diuresis of water, sodium and chloride—→ dehydration, thirst, et cetera.
3. Increased ketogenesis—→ ketonemia and ketonuria.
4. Acidosis from ketonemia—→ low serum bicarbonate, low pH, hyperventilation, vomiting, insulin ineffectiveness, increased breakdown of tissue, cerebral anoxia.
5. Increased breakdown and altered composition of tissue—→ variable losses of nitrogen, potassium, magnesium, phosphate, et cetera.
6. Body electrolytes lost by 2 and 5 above. Since these losses are accompanied by large but variable losses of water, the actual concentrations of these electrolytes may not be diminished in spite of large total losses.
7. Dehydration, indirectly because of electrolyte losses and directly because of water losses through lungs, skin and kidneys. Water, chloride and potassium losses from vomiting. Dehydration and NaCl depletion—→ hemoconcentration, vomiting, fall in blood volume and blood pressure, shock, anuria and tissue anoxia.
8. Anoxia and ketonemia—→ coma.

More detailed discussions of some of these inter-related events can be found elsewhere. For example, Butler¹ has outlined some of the many factors which may be operative in creating a state of insulin ineffectiveness and has admirably defined the deficits of water and electrolyte that may be sustained. Peters¹² has reviewed the problem of starvation diabetes and the mechanisms responsible for utilization of glucose. Danowski, Winkler and Peters³ have discussed the problem of peripheral circulatory failure and salt depletion. Holler,⁸ Danowski² and others^{13,14} have pointed out the importance of altered potassium and phosphate metabolism in diabetic coma. Kety⁹ and Guest⁷ have reviewed the effects of acidoses *per se* on cerebral function, insulin effectiveness and the composition of body tissue.

General Comments on Treatment

Objectives.—With the essential characteristics of diabetic coma in mind, the objectives of treatment are readily apparent and are as follows:

1. To transfer the combustion of fat to carbo-

hydrate as rapidly as possible. Insulin, in large amounts, is the most important therapeutic agent to achieve this end. The early use of fructose also may prove to be important. When the level of the blood sugar falls, adequate supplies of glucose are also required.

2. To restore normal composition, in concentration and total amount of the extracellular and intracellular components. This is accomplished by appropriate use of sodium chloride in water, of alkaline solutions and of other agents such as potassium and phosphate. Complete nutritional recovery does not occur until the patient begins to eat.

3. To support the circulation. This is achieved by prompt use of saline solutions and by appropriate use of colloidal solutions (plasma or whole blood).

5. Finally, when therapeutic exertions are directed at one phase of the problem, it is important that harmful effects of therapy are not induced in other ways. Rules of therapy must be flexible.

Initial Evaluation and Laboratory Tests.—The history and physical examination will usually indicate the precipitating cause of the coma, the duration and severity of the disturbance and the degree of dehydration and acidosis. Difficulties in therapy can be anticipated if the patient has a serious, complicating disease and/or if the patient has been ill for more than a day before admission.

As soon as possible after admission certain procedures should be more or less routinely carried out. It is of great importance that an accurate record is kept during the entire course of therapy. It is imperative to know, at any time during treatment, the amounts and nature of fluids which have been given, the current results of laboratory tests of blood and urine, the amounts of insulin administered, the blood pressure and condition of the patient. These records must be kept on a special "treatment-sheet" or "flow-sheet"; only confusion will result from data separately recorded on the usual hospital "progress notes," "laboratory sheets" and "nurse's notes."

The determination of the blood glucose and the glucose, acetone and diacetic acid of the urine aid in substantiating the diagnosis; their subsequent determinations at frequent intervals are essential in following the course of treatment. In

fact, while other laboratory tests give important information, determinations of the course of the blood and urine glucose and urinary ketone-acids are tests which are the most applicable, generally available and informative in most cases. Urine tests for glucose and ketone-acids should be carried out at hourly intervals; blood sugar determinations at about four-hour intervals. The dangers of hypoglycemic reactions during the course of treatment are discussed under the section on insulin therapy.

Initial and serial determinations of the serum bicarbonate are less helpful as a guide to therapy than often assumed. If the respiratory center is not depressed the initial CO_2 concentration provides a fairly good index of the severity of the initial metabolic acidosis; however, careful appraisal of the patients' clinical progress, the response of the glucose in the blood and urine, the rate of disappearance of ketone-acids, evidences of other deficiencies (e.g., potassium) are much more important than subsequent determinations of the serum bicarbonate.

The initial concentrations of sodium and chloride in serum give little information regarding total needs of these electrolytes (see section of parenteral fluid therapy). Their determination later during the course of treatment aids in the appraisal of the appropriateness of previous fluid therapy.

Since acidosis, dehydration and starvation alter tissue composition and accelerate tissue catabolism, the products of these changes (potassium, phosphate, nitrogen, et cetera) must be excreted by the kidneys. Elevated initial concentrations of these indicate renal decompensation. Further, since the concentrations of potassium and phosphate in plasma invariably fall during treatment when carbohydrate utilization is accelerated and intracellular constituents are reconstituted, their initial and subsequent determination lends precision to therapy. The serum potassium can be rapidly determined by the flame photometer and a low value always indicates potassium deficiency. The use of the electrocardiogram, and other clinical signs in the evaluation of potassium deficits or excesses has been well discussed elsewhere.^{4,5,6}

In the author's experience the routine use of gastric aspiration and lavage of patients in diabetic coma is, at best, an unnecessary maneuver. In fact, the further removal of gastric fluid from a patient already deficient in water and salt does not seem to be good or reasonable treatment. Only

very rarely does serious atony and distension of the stomach occur. Depletion of sodium and also of potassium, from any cause, usually leads to atony of the gastrointestinal tract and vomiting. In diabetic coma vomiting almost invariably promptly ceases as soon as therapy with saline solutions and insulin is begun. Oral feedings should not be attempted until nausea has completely abated. Should vomiting recur, oral feedings should be immediately discontinued and resumed only after several more hours of treatment have elapsed.

Insulin Therapy

Different schemes of insulin therapy in diabetic coma have been suggested. Some recommend a very large initial dose (300 units or more); others suggest more moderate amounts to be administered at more frequent intervals. There is no proof that these slight differences in technique appreciably influence the outcome. All are agreed that when the diagnosis of diabetic coma is made, therapy with insulin should begin as promptly as possible and that large amounts usually will be required to effect accelerated utilization of glucose. The total amount which will be ultimately required cannot be accurately predicted at the beginning to therapy; this amount will depend on a variety of factors (known and unknown) operative at the time, as well as on the initial severity of the disturbance.

A rather simple scheme of proven value in adults is to administer 40 to 50 units of regular (crystalline) insulin intramuscularly and a similar amount intravenously in the first intravenous infusion. At hourly intervals thereafter similar amounts are given intramuscularly. When the blood sugar definitely begins to fall or the glycosuria diminishes or disappears, the administration of insulin should be temporarily discontinued (i.e., usually for three to four hours) and the administration of 5 per cent glucose in water or saline begun. It seems to the author that more errors in therapy occur at this point than at any other time. Often, through negligence or fear of administering glucose, the patient is allowed to develop a hypoglycemic reaction. Or, on the other hand, the insulin is discontinued for too long an interval, thus permitting its effects to become dissipated and allowing the formation of ketone-acids again to increase. Indeed, at this crucial point the utilization of carbohydrate has, at least in part,

been restored; yet, the presence of short-acting insulin and its salutary effects must not be allowed to disappear. Therefore, after the administration of glucose solutions has begun, moderate amounts of insulin (15 to 30 units) should again be given every three to four hours until ketonuria has disappeared and virtual recovery has occurred.

Any fears regarding the use of glucose at this later time in therapy are unfounded. The administration of glucose will prevent the occurrence of hypoglycemic reactions, some of which may be severe. Hypoglycemia should be scrupulously avoided since this state (carbohydrate starvation) again sets in motion many serious, undesirable effects, i.e., depletion of glycogen stores in the liver, accelerated combustion of fat and subsequent intolerance to carbohydrate. These complications are those which therapy was originally designed to correct. Not infrequently, patients, partially recovered from their ketosis, develop further hyperglycemia and ketosis consequent upon a hypoglycemic episode.

It should be emphasized that all orders for insulin should be "stat" orders, given by the attending physician according to the total information available at the time. In this emergency orders should never be given several hours in advance. Also, it seems that the repeated administration of smaller amounts of insulin provides a more flexible technique than the administration of a very large, single, initial dose. The former method provides an overlapping of the effects of each dose and thus a continuous action. The use of a very large initial dose leads to uncertainties as to when, and how much insulin should be subsequently given. Also, a precipitous, unchecked fall in the blood glucose will lead to a severe insulin reaction with its attendant deleterious consequences.

Parenteral Fluid Therapy

General Comments. Fluid therapy only during the first twenty-four hours will be considered. Usually by this time clinical recovery has largely taken place and oral feedings are tolerated. Complete chemical or nutritional recovery with repletion of destroyed and damaged body tissue undoubtedly requires several days.

It is not possible to calculate by any preliminary laboratory test, the total losses of water, sodium, chloride or other elements sustained by any individual during the development of the ketonemic

acidosis. The distortions in intracellular and extracellular composition of carbohydrate, electrolyte, and water are complex and theoretic objections can be raised against almost any scheme of therapy now available because the solutions used in therapy cannot be made to be entirely physiologic to meet all needs and because the distortions in composition of the body fluids, though generally similar, are not identical in different patients.

For example, the use of hypotonic solutions of saline, rather than 0.9 per cent sodium chloride, can be advocated to accelerate cellular accumulations of water.¹ On the other hand, the value of hypotonic solutions has yet to be proved and their use may be harmful when given to patients whose initial concentration of sodium and chloride are low and/or who are in incipient or frank peripheral vascular collapse. Too rapid infusion can lead to hemolysis of red cells. Also, while the early use of glucose in diabetic coma will undoubtedly accelerate carbohydrate utilization and diminish ketosis,¹² its use will exaggerate renal losses of water and salt and will increase cellular dehydration. "Physiologic" saline (155 mEq./L. of Cl) can be objected to on the grounds that it contains an excess of chloride (normal chloride of extracellular fluid: 103 mEq./L.) and its use will almost invariably lead to some degree of "chloride acidosis." The early use of alkaline solutions may be advocated to promptly correct the pH of the body fluids, to increase the effectiveness of insulin, to improve cerebral utilization of oxygen and to diminish the catabolism of tissue induced by the acidosis. Yet, used injudiciously, alkalis may lead to alkalosis later in therapy or cause sodium to enter cells already depleted in potassium. Furthermore, while potassium and phosphate depletion invariably occurs during treatment, their use in therapy may be dangerous if renal function is impaired. This is such an unhappy state of affairs that the physician, especially if an expert, might lack courage even to treat a patient in diabetic coma.

On the other hand, in spite of the complexities of the problem, almost all patients in diabetic coma can be saved in spite of the occurrence of temporary, unphysiologic complications which may be induced during treatment, provided these complications are not allowed to become exaggerated. This can be accomplished by careful clinical and chemical observation of the patient during the

course of therapy and by the avoidance of gross misuse of those agents used in treatment. Further, since all final adjustments in electrolyte and water composition of the body fluids are accomplished by the kidney it is of great importance to restore or maintain normal renal function. Thus, circulatory failure must be promptly treated with colloid and saline solutions, enough water must be supplied to the kidneys to maintain a good flow of urine and the concentrations of electrolytes brought at least toward the normal range. If renal function is maintained, mild or moderate temporary distortions in the composition of the body fluids will be automatically corrected.

1. *Physiologic Saline Solutions and Glucose.*—

Prompt repletion with saline, of the large total losses of water, sodium and chloride, which have been sustained during the development of the acidotic state, is a part of every scheme of therapy. The losses of water and sodium chloride are not always proportionate in different individuals. All suffer from a total deficiency of salt and water, yet the concentrations of sodium and chloride in the extracellular water and blood may be low, or normal, or even somewhat elevated at the time of admission. In those patients in whom the acidosis develops gradually, the associated polydipsia may prevent severe primary deficits of water while renal losses of sodium chloride continue. In these the initial concentrations of sodium chloride will be depressed and the extracellular fluids are thus hypotonic. Should vomiting then result the salt depletion is aggravated. With salt depletion increasingly large, renal losses of water occur in an effort to maintain tonicity of the body fluids. The volumes of the blood and extracellular fluids become contracted and peripheral vascular failure ensues. Thus, those individuals who have been ill longest, before admission to the hospital, almost invariably have sustained the greatest total losses of water and electrolyte and have the poorest prognosis.

When the development of coma is rapid, water deficits may be proportionately greater than the deficits of sodium chloride. While the patient ingests no fluids, large amounts of water will be lost through the lungs with hyperventilation and through the skin. In these the concentrations of sodium and chloride may be somewhat elevated on admission. Thus the total needs of water, sodium and chloride in the individual patient

cannot be estimated by available laboratory techniques.

On the other hand balance studies have indicated that deficits as great as 35 to 40 grams of sodium chloride³ may occur in severe ketosis. In order to cover maximum deficits, this amount (equivalent to that contained in about four liters of physiologic saline) should be given intravenously to all adult patients during the first day of therapy. Surely no more than five liters of saline are ever indicated during this interval.

The first liter of physiologic saline should be given rather rapidly, e.g., during the first one to two hours after admission; the remainder of the sodium chloride is given more slowly. Under certain circumstances alkaline solutions (e.g., 1/6 molar sodium lactate or 3 per cent sodium bicarbonate) may be definitely indicated early in treatment (see below) and can be temporarily given in place of the saline.

Also, in addition to (not in place of) the saline, the early administration of intravenous solutions of fructose may prove helpful in accelerating utilization of carbohydrate.¹¹ This is likely because unlike glucose, the utilization of fructose is normal in the diabetic with or without ketosis.

Furthermore, after treatment has progressed for four to six hours, and while saline is being administered at a slower rate, the addition of other therapeutic agents (e.g., glucose, potassium and phosphate) may be indicated (see below). The addition of glucose (5 per cent glucose in saline) is surely indicated when it is demonstrated that the blood sugar is definitely falling or glycosuria is disappearing (see section on use of insulin during this interval). Little objection can be raised against the use of glucose at this later time. The use of glucose *early* in treatment and in rather large amounts is another matter. This problem has provoked much debate, especially because there can be little doubt that the administration of glucose will accelerate its peripheral utilization, diminish ketosis, increase hepatic glycogenesis and prevent carbohydrate starvation. However, the treatment of diabetic coma does not involve only those measures which are useful in diminishing ketosis and accelerating carbohydrate utilization. The secondary derangement (e.g., water and salt depletion and cellular dehydration) are equally, if not more, important, in the immediate management of this medical emergency. Therefore, the most valid arguments against the early use of gen-

erous amounts of glucose are that, at this critical period, exaggerated hyperglycemia and excessive diuresis of water and electrolytes are induced. At this time the rate of glucose utilization is slow; further elevation of the blood sugar only can lead to further passage of water from already dehydrated cells. The induced, excessive diuresis will delay repletion with water and electrolytes. These arguments against the use of glucose apply only during the early hours of therapy; the advantages of the later judicious use of glucose are recognized.

Alkaline Solutions.—Since some reputable centers rather routinely employ alkaline solutions early in acidosis and others do not, it is likely that the use or omission of alkali is not crucial in the treatment of most, but not necessarily all, cases of diabetic acidosis. However, the reasons for its judicious use seem to the author to outweigh the theoretic objections which may be offered in opposition. It is true that in diabetic ketosis the sodium of the plasma is merely temporarily combined with the ketone-acids (hence, a decrease in base available to form bicarbonate) and, during treatment with insulin, a diminution of ketosis results in release of the sodium to form bicarbonate. The use of alkalis would thus seem, at most, unnecessary. In many instances this situation is undoubtedly the case. On the other hand, there is considerable evidence that the acidosis *per se* will lead to impaired action of insulin,¹⁰ decreased cerebral utilization of oxygen⁹ and accelerate catabolism of tissue.⁷ Thus, the prompt, rather than gradual, alleviation of the acidosis would seem indicated in most cases. In fact, it is possible that in some instances its prompt alleviation might be crucial. Guest⁷ has summarized some of the arguments in favor of the use of alkalis.

In the author's experience there are certain circumstances wherein the use of alkaline solutions are particularly indicated. These are, (1) when the hyperpnea is severe and exhausting, (2) when the coma is profound, (3) when, with therapy, the insulin needs seem unusually high, and (4) when the initial serum sodium concentration is found to be low. Only alkalis will stop severe hyperpnea, and the depth of coma, as indicated by the rate of cerebral oxygen utilization, is directly related to the degree of acidosis (pH).

But, when alkaline solutions are used, they must be used with intelligence. The early administration of an excess of alkali will later lead to alkalosis

when the ketone bodies release the sodium. Since the acidosis is already partially compensated, it is obvious that it is *not* necessary to raise the serum bicarbonate to normal levels to effect a normal pH. Also, the degree of compensation cannot be known in any case unless a pH is obtained, and this determination is not usually available. In adults, even in severe coma, 500 ml. of 3 per cent sodium bicarbonate or 1000 ml. of M/6 sodium lactate usually is sufficient to obtain the desired correction of the pH. Under no circumstance should more than 800 ml. of the bicarbonate solution or 2000 ml. of the M/6 sodium lactate be used. The desired result is usually attained by merely raising the bicarbonate 5-10 mEq. (10 to 20 volumes per cent); *not* by raising it to normal.

Since cellular and extracellular potassium depletion, in varying degrees, occurs in all patients with diabetic coma and since an excess of sodium appears to aggravate depletion in potassium, it is particularly advisable to administer potassium as soon as possible (not before four hours of treatment however) to all patients given alkaline solutions.

Potassium and Phosphate Therapy

At the time of admission, when the dehydration is severe, the concentrations of potassium and phosphate in plasma are either normal or elevated.¹³ After four hours of treatment the concentrations of both are appreciably decreased, and usually by eight hours their concentrations are well below normal, unless renal function is impaired. Their concentrations fall because of the effects of dilution, because of continued excretion into the urine, and because of their movement into depleted cells. While the deleterious effects of phosphorus depletion have not been clearly defined, the evil consequences of potassium deficiency are well recognized (decreased neuromuscular function, cardiac insufficiency et cetera).

Early repletion of both elements, but especially of potassium, appears to be indicated in all but the milder cases of diabetic acidosis. Aqueous solutions containing both of these electrolytes are available.* Potassium, without phosphate, can be supplied as potassium chloride. Three precautions always *must* be observed when potassium is administered to patients in diabetic coma. First, potassium

should not be given until treatment has been in progress for at least four to six hours. Second, an adequate flow of urine should be present when treatment is begun. Third, it should not be administered at a rate greater than 20 mEq. per hour (for example no more than 1.5 gm. of KCl per hour). These precautions are necessary because the concentrations of potassium tend to be high at the beginning of treatment and because toxic concentrations of potassium may result if its administration is too rapid or if renal function is impaired. These electrolytes are added to the solutions already being administered, e.g., to the physiologic saline solutions or to the glucose-in-saline or water solutions. When the patient is able to eat, this type of supplemental therapy is usually no longer necessary. Most patients are able to eat by the time they have received 75 to 100 mEq. of potassium parenterally.

Plasma or Whole Blood.—While it is apparent that the peripheral vascular failure in diabetic acidosis is mainly a consequence of salt depletion, it is equally apparent that in some cases salt replacement alone is not adequate therapy. It is known that the shock of salt depletion is more adequately treated with colloid solutions and saline than with saline alone.¹⁵ Plasma or blood should be immediately administered to any patient whose blood pressure does not promptly respond to administered saline, or to any patient whose blood pressure falls toward critical levels during treatment. This procedure can be life-saving.

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(Continued on Page 1079)

* Ampuls containing 25.8 mEq. of potassium as dibasic and monobasic potassium phosphate are available from the Eli Lilly & Company, Indianapolis.

The Problem of Diabetic Retinopathy

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A REVIEW of the historical aspects of diabetic retinopathy uncovers some interesting facts. Jaeger²¹ in 1856 first described the specific ophthalmoscopic changes in diabetic patients but it was thirty-four years later that Hirschberg¹⁷ published his paper dividing the retinal changes into three groups.

1. Central punctate retinitis—an "inflammation" of the retina.
2. Retinal hemorrhages.
3. Pigmentary degeneration.

From 1899 until the introduction of insulin in 1921, and the subsequent investigations of the "post-insulin" era, the controversial point was whether the ophthalmoscopic changes present in diabetic patients were "specific" to the diabetes or "non-specific," related to arteriosclerosis.

The inability to solve the problem at that time seems to have been based on two facts. First, there was a relatively small group of patients on whom observations could be made in this "pre-insulin" period. They were the older individuals who developed mild diabetes later in life and who could be controlled by diet only and in whom arteriosclerosis was present prior to the development of the diabetes. Second, as Friedenwald¹⁴ has pointed out in this period very few eyes were examined and in these little attention was paid to the vascular picture. This seems remarkable in view of the fact that as early as 1876 MacKenzie²⁶ first described the microaneurysms which have played so important a part in our present knowledge of the pathogenesis of diabetic retinopathy, as we shall see later. Today it is hard to account for the long period of time that elapsed from its first description in 1876 until the 1940's when the intensive investigation was begun by Ballantyne and Lowenstein,^{3,4} Friedenwald¹⁴ and Ashton.²

With the discovery of insulin there was a marked change in the outlook for the diabetic patient,

particularly from the standpoint of life expectancy. The introduction of antibiotics markedly reduced the mortality from infections and further increased the life expectancy. But with the boon of insulin and antibiotics the bane of vascular complications increased with the increase in the life span of the diabetic. This is demonstrated in two series of cases of Joslin and Wilson.²⁰ The causes of death given for 157 children who died between 1908 and 1922 were 86 per cent died of diabetic coma and 6.4 per cent of infections, whereas in 135 children who died between 1944 and 1949, 9.6 per cent died of coma, 7.4 per cent of infections, 11.9 per cent of tuberculosis, while 59.3 per cent died of cardiorenal vascular disease. In this latter series 60 per cent of these children had retinopathy and 4 per cent retinitis proliferans. This is in striking contrast to Duke-Elder's statement¹³ in 1940 that diabetic retinopathy prior to the age of forty is rare.

Thus as the patients lived longer due to the introduction of insulin and as the mortality from infection was decreased by the antibiotics, the incidence of vascular complications rapidly increased. With the increase in vascular complications there was an increase in the incidence of visible ophthalmoscopic changes, in fact, in all of the ophthalmologic complications. Wagener³⁵ found in 1921 only 8.3 per cent with retinopathy; in 1934, 17.7 per cent; and in 1945, 30 per cent. The latter figure approximates the 31.7 per cent of 561 patients of all age groups in 1946 reported by Ballantyne.⁵ Friedenwald found diabetic retinopathy three times as frequent in the postinsulin period as in the early insulin period.¹⁴

Analogous to Joslin and Wilson's mortality studies²⁰ are the findings of Wagener³⁵ in 1921, none of the patients with retinopathy was under the age of forty (see also Duke-Elder above), in 1934, 4.3 per cent were below the age of forty and this figure was tripled to 12.9 per cent (or 8.3 per cent of the total) in 1945. In 1952 the present authors³⁴ in a series of thirty-four patients with advanced diabetic retinopathy showing proliferating retinopathy and neovascularization, 26 per cent of the patients were below the age of forty. While admittedly this series is small it nevertheless shows that the juvenile diabetics are living long enough to develop advanced diabetic retinopathy.

Recently two problems have been of great importance from a diabeto-ophthalmologic standpoint. They are:

1. The influence of control of diabetes on the development of vascular lesions.
2. The pathogenesis of diabetic retinopathy.

Influence of Control of Diabetes on Development of Vascular Lesions

A. Free or Normal Diet School.

This school, championed by Dolger¹¹ and Tolstoi³³ feels that vascular lesions are a part of the diabetic process and not influenced by the control of the blood sugar. In a series of 200 patients with the duration of diabetes up to twenty-five years, Dolger reported that all showed retinal hemorrhages regardless of duration, degree or type of treatment.

The criterion of treatment consists of a maintenance of the weight level at all times, the freedom from symptoms and ketosis and the use of insulin for hyperglycemia particularly for the prevention of excessively high blood sugar.

Friedenwald¹⁴ and Ashton¹ have noted that the development of retinal hemorrhages is not closely related to the degree of control of the diabetes.

Some evidence to support this theory is reported by Bell¹⁰ who studied the vascular lesions in 1,559 autopsies on diabetic patients. In this study 5 per cent developed diabetes before the age of twenty in which no deaths were found due to vascular disease; 16 per cent developed diabetes before the age of forty of which 23 per cent died from vascular disease; and 70 per cent developed diabetes after the age of fifty in which 54 per cent died from vascular disease. In a control group of non-diabetics 30 per cent over fifty died from some form of vascular disease. From this it was postulated that only 24 per cent rather than 54 per cent died from vascular disease due to the diabetes. With the onset of the diabetes before forty, there was a striking influence of the duration of the diabetes on the development of vascular disease. In the first ten years of the disease, few patients presented evidence of vascular disease but after twenty years few patients were free of vascular disease. Of ninety-three patients who had the disease more than twenty years, twenty-eight revealed no serious vascular disease at autopsy. The authors felt that the presence or absence of vascular disease could not be related to better control.

B. Rigid Control School.

The outstanding exponents of this theory (Joslin, Root, Wilson, Marble, White, et cetera) feel that the vascular changes are directly attributable to

uncontrolled diabetes and can be prevented to a great extent by rigid dietary restriction and control of blood sugar at all times.

Joslin¹⁹ reported that twenty-three patients had received the Victory Medal. The age of onset ranged from fourteen and a half to thirty-two years, but only one patient was over twenty-three years of age. The longest duration was thirty-four years. The youngest was twenty-seven and the oldest sixty-one.

In this same paper Joslin reported that forty patients under his care had had diabetes from thirty to thirty-five years with its onset in childhood. Thirty-three of the forty were working steadily and 82 per cent had ocular involvement, but only five had proliferating retinopathy. None of the forty were blind. Of 181 patients who had had diabetes twenty to thirty years 114 were checked by ophthalmologists and 56 (49 per cent) showed retinal arteriosclerosis; 5 per cent had retinal hemorrhages, and twenty-three had exudates. Seventeen had proliferating retinopathy and six patients had cataracts. Four were almost or completely blind and three were blind in one eye.

Spoont et al³² studied a series of fifty patients, all of whom had had diabetes at least ten years, seven of whom the onset had been before the age of twenty. Twenty-five were considered well controlled and twenty-five considered poorly controlled. In the well controlled group four (16 per cent) had retinal lesions while in the poorly controlled group seventeen (68 per cent) had retinopathy.

Walker,³⁶ reporting on seventy-five juvenile diabetics, shows a correlation not only in the duration of the diabetes on the development of retinopathy but on the degree of control as well.

Sherrill³¹ reported on twenty-six diabetics of twenty to thirty-eight years duration with the onset of diabetes after eighteen years of age and fourteen patients with a twenty to thirty year duration with onset before seventeen years of age. All of these cases were well controlled. In the entire group only eight showed grade II diabetic retinopathy (Boston group class). The rest showed only grade I or less.

Grayzel and Warshall¹⁶ reported on twenty-five patients with juvenile diabetes, the range from eleven to twenty-eight years and the age of onset at twenty-seven years or younger. All seven patients with good control showed an absence of retinopathy while seven classified as poorly controlled

DIABETIC RETINOPATHY—BEARDWOOD AND TRUEMAN

TABLE I.

Duration	Controlled	Free Diet	Coma
10-15 yrs.	18%	19	58
15-20 yrs.	40%	52	62
20-34 yrs.	36%	68	70

showed retinal involvement and two showed renal involvement.

Post and Stickle²⁸ concluded in their study of juvenile diabetics that the control as well as the duration of the diabetes is an important factor in the development of diabetic retinopathy, renal damage, and poor physical condition.

Keiding, Root and Marble²³ in a study of 451 cases found that in diabetic patients with the duration of twenty years or more, moderate or marked retinopathy, arteriole calcification and nephropathy existed in 54 per cent of cases well controlled, 73 per cent of cases with fair control, and 92 per cent with poor control. They concluded that the vascular complications were related not only to duration but to the degree of control as well.

Wilson, Root, and Marble³⁸ carried out a direct comparison in 221 patients between the "ideal" control, the "free diet" group and a "coma" group, insofar as vascular complications were concerned. The "ideal control" group followed the requirements of their system of control; the "free diet" group followed the Tolstoi-Dolger régime; and the "coma" group had had diabetic coma on one or more occasions regardless of cause or previous management and with few exceptions were consistently poorly controlled. Each of the three management groups were subdivided according to the duration into a ten to fifteen-year group, a fifteen to twenty-year group, and a twenty-one to thirty-four-year group. Their findings relative to advanced lesions are shown in Table I.

Their conclusions were that the increase in frequency severity of degenerative vascular complications of diabetes was commensurate with the increases in duration of the disease. For any given duration of the disease there was a significant lower incidence of the advanced degenerative changes among those patients who had maintained better control and that for each ensuing decade of duration the effect of good control became more important. Eight per cent of those under rigid control after twenty years showed normal retinae and an absence of calcified blood vessels while none under the "free diet" management showed

them. Between twenty to thirty-four years 57 per cent of the "free diet" group showed advanced degenerative changes while only 25 per cent of the well controlled group showed such lesions.

In preparation for this paper, we surveyed 385 cases seen during the past few weeks in office and clinic practice. There was no selection of these cases nor has any attempt been made to differentiate those with hypertension or increased capillary fragility as we felt that they were equally present in both series. In this group there were 277 patients whose diabetic control we deemed satisfactory, and 108 patients whose control did not fit our accepted standards during the years in which they had been under observation. It is interesting that in the majority of adequately controlled patients having had diabetes from six to over twenty years, the incidence of extensive retinitis was significantly less than in the poorly controlled group. Of the 277 patients with good control, 261 had no retinal changes or no more than two or three punctuate hemorrhages. Of the twenty-seven patients who had diabetes more than twenty years, twenty-three had only minimal changes. Of the 108 patients poorly controlled, only fifty-five had minimal changes. Nine of the twenty-year group had advanced retinitis.

Anti-Fragility Drugs

The relationship of capillary fragility and diabetic retinopathy is a controversial subject. However, we have been impressed that a large number of cases do show marked increase in their capillary fragility and this was most noticeable in the young diabetic beginning to develop the picture of diabetic nephrosis, and, indeed, it seemed to show almost a direct proportion between the degree of capillary fragility and of retinitis. It seemed logical to us that there should be an attempt to correct this abnormality. There are conflicting reports in the literature. Barnes,⁶ Rodriguez and Root³⁰ and Levitan²⁴ feel the Rutin was ineffectual in the management of retinitis. Wilder,³⁷ Donegan and Thomas,¹² Beardwood, Roberts and Trueman⁷ report some decrease in the incidence of hemorrhages in those patients with increased capillary fragility, which was correctable by the use of anti-fragility drugs. With this in mind, we are treating a series of juvenile diabetics with increased capillary fragility, but no evidence of retinitis, with Rutin in doses adequate to maintain normal capillary fragility. This study has not progressed suf-

ficiently for us to draw any conclusions nor can proper evaluation be made until at least ten years of such a program.

Urinary Infections

Chronic urinary infections in the diabetic, if uncorrected, are apt to produce over a period of years a pyelonephritis terminating in a condition which is difficult to differentiate clinically from intercapillary glomerulonephrosclerosis. Indeed, so similar is the late picture of a pyelonephritis in the diabetic that there is a tendency to group it with Kimmelstiel-Wilson's disease under the name of diabetic nephropathy. We feel it is essential to follow these cases very carefully over months and years to make sure that the urinary infection has been eradicated by the judicious use of antibiotics, remembering also that urine which contains sugar is oftentimes a good culture media for the organisms most frequently found in the urinary tract and that to eradicate many of these pyurias, the urine must be kept sugar free even if multiple doses of regular insulin are required.

Diabetic Nephrosis

Diabetic nephrosis, which by general usage includes the so-called Kimmelstiel-Wilson syndrome as well as pyelonephritis secondary to long-standing urinary infections is practically always associated with a varying degree of diabetic retinitis. Indeed, retinitis is one of the presenting symptoms of this syndrome. The etiology of the Kimmelstiel-Wilson picture is not well established. Not only do these two conditions occur together but so similar is their pathological description that the question naturally is raised as to whether or not one common etiological factor may not account for both.

While the question of the effect of control on vascular complications has not been answered as yet we feel that since the preponderance of evidence is in the favor of the "rigid control school" adherence to the régime of that school should be followed until the problem is solved completely and to everyone's satisfaction.

Pathogenesis of Diabetic Retinopathy

Within the past ten years considerable light has been thrown on the nature of the vascular degenerative changes in diabetes by ophthalmologic investigation. It has been well established that the earliest lesions in the retina in diabetic retinopathy

are the capillary microaneurysms which we have seen were first described by MacKenzie in 1876. This observation has been repeatedly confirmed by the work of Ballantyne and Lowenstein,^{3,4} Friedenwald¹⁴ and Ashton.² Furthermore, a further link has been added by the work of Ashton who has shown a close similarity in the staining characteristics of the hyaline of retinal capillary aneurysmal dilatations and the hyaline material found in the nodules of the kidney in intercapillary glomerulosclerosis of Kimmelstiel-Wilson² disease.

Further observations and investigations suggested that other hormonal factors contributed to the development of the vascular degenerative changes, not inherent in the diabetic process itself. Poulsen²⁹ reported on the recovery from diabetic retinopathy in the case of diabetes who developed Simmond's Disease following a severe postpartum hemorrhage. In his paper he reviewed a series of eight previous cases in the literature of the Housay phenomenon in man; none of the cases, however, had had careful ophthalmologic examination.

It is known that experimental animals made diabetic by the use of alloxan do not develop retinopathy.¹⁸ However, Lukens and Dohan²⁵ have found the lesions of intercapillary glomerulosclerosis in the kidney of an animal made diabetic for five years by the use of anterior pituitary extract.

Recent work has suggested an adrenal cortex factor in the development of diabetic retinopathy. Friedenwald¹⁵ and Becker⁸ reported on observations on pregnant diabetics developing retinopathy which disappeared following the termination of the pregnancy. They felt that during pregnancy there was an increase in the production of the adrenocorticotrophic hormone producing retinopathy but that after the pregnancy was ended there was a decrease in the production of this hormone and the retinopathy cleared.

The ACTH factor was further confirmed by the appearance of capillary aneurysmal lesions in the fundi of two patients receiving intravenous corticotropin for sarcoid and their disappearance when the corticotropin was stopped. Becker⁸ also found capillary aneurysms in some patients with adrenal hyperplasia.

As we have seen, alloxan diabetic animals do not develop retinopathy but Becker⁸ was able to produce the changes of early diabetic retinopathy by ophthalmoscopic examination and capillary

aneurysms and changes in the capillary pattern by microscopic examination in alloxan diabetic animals treated with ACTH.

Becker⁸ in the study of the adrenal glands at autopsy of patients with and without intercapillary glomerulosclerosis attempted to correlate the cortisone production with the development of the renal and retinal lesions. He theorized that there is a compensatory decrease in the capacity of the adrenal cortex in certain activities in the uncomplicated diabetic, but in the diabetic with renal and retinal vascular lesions the normal or increased capacity of the adrenal cortex may be related to the causation of these lesions. This was based on the fact that the adrenal glands in the patient with Kimmelstiel-Wilson lesions weighed 24 per cent more than an almost equal number of patients without Kimmelstiel-Wilson lesion. A further finding was that in the patients with Kimmelstiel-Wilson syndrome there was a higher incidence of lipoid vacuoles in the cortex than in the uncomplicated diabetic and non-diabetic adrenal gland.

Becker⁹ at the 1953 meeting of the Eastern Section of the Association for Research in Ophthalmology summarized the evidence for the role of the adrenal cortex in the pathogenesis of Kimmelstiel-Wilson-diabetic retinopathy syndrome as follows:

1. Clinical Evidence. Decreased adrenal capacity in diabetics without retinopathy and relatively increased adrenal function in diabetics with retinopathy—by oxysteroid excretion.

2. Therapeutic Evidence. Possible improvement of diabetic retinopathy by decreasing adrenal function—observation in Simmond's Disease in diabetics, observations on the use of testosterone and following adrenalectomy.

3. Hystopathologic Evidence. Relative adrenal hypotrophy, excessive lipoid vacuolization and increased incidence of adrenal cortical adenomas in the Kimmelstiel-Wilson-diabetic-retinopathy group.

4. Experimental Evidence. Production of lesions simulating diabetic retinopathy and Kimmelstiel-Wilson in alloxan diabetic rabbits by use of cortisone or ACTH.

Maumenee²⁷ in his splendid review of diabetic retinopathy in the year 1952, felt that this association was inconstant, quoting also Kane,²² Wilson, Root, and Marble³⁸, and Keiding, Root, and Marble.²³ Our observations at the Graduate Hospital tend to confirm Maumenee's opinion.

One must concede that the weight of observations and investigations is on the side of the adrenal cortex as playing a major role in the development of diabetic retinopathy, but whether this is the answer or only an integral linking in the chain leading the "X" factor depends on further laboratory and clinical investigations. Our present methods of evaluating the function of the adrenals are far from satisfactory. Can one postulate that the diabetic with increased adrenal function is more difficult to control or more careless than the one with normal cortical excretion.

Comments

It has always been the opinion of the authors that closer co-operation between the internist, particularly those treating diabetics, and the ophthalmologist is imperative. It has been felt that the diabetic patient should have a complete ophthalmologic survey at least once a year and if practicable twice a year. It is felt that the internist should himself check the patient's eye grounds periodically. Certainly it is not expected that the internist be an expert in the ophthalmologic field but he should be able to use an ophthalmoscope well enough to recognize the ophthalmoscopic changes seen in diabetic retinopathy. At the Graduate School of Medicine of the University of Pennsylvania the Ophthalmology Department faculty lecturing the internal medicine group attempts to reacquaint the students with the use of the ophthalmoscope and demonstrate the ophthalmoscopic changes found in general medical conditions. In general, the recognition of the normal ophthalmoscopic appearance of the ocular fundus is the basis upon which pathologic changes are recognized.

The presence or suspicion of pathology indicates the necessity for an ophthalmologist's examination and opinion. It has been repeatedly reported and the observation of most ophthalmologists that only after development of visual complaints is an ocular examination requested. Most ophthalmologists have encountered occasionally diabetic retinopathy in some degree during the process of an ophthalmologic examination in a patient in whom the disease was undiagnosed or even unsuspected. Certainly in the cases of hospitalized diabetic patients an ophthalmologic consultation is an integral part of the studies.

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DIABETIC COMA AND ITS TREATMENT

(Continued from Page 1073)

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Functional Rehabilitation in Diabetes

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The Proposition

SUBSTITUTIONAL therapy with insulin has by and large crowded out the much more physiological principle of functional rehabilitation of the patient's own insulin-producing mechanism.^{4,5} It has been amply demonstrated in the endocrinopathies and in physiology in general that vicarious substitution from without for a lame hormonal function further depresses and may even suppress the intrinsic productive source of that hormone.^{9,11,15,19,23,24} It is well recognized that the normal stimulus to an intact insulin-producing mechanism is ingested carbohydrate.⁶ Homeostatic influences which level off the short, transient and normal postprandial rises in blood glucose are actually called into play by the very fact that there is present this effective stimulus to initiate their activity (Fig. 1). The uncontrolled diabetic patient has long since become unresponsive to such delicate glucose stimulation; his insulin-producing mechanism has become refractory to a heightened blood glucose, which in the normal would constitute a real and tremendous stimulus (much as the frog-muscle preparation becomes refractory to long-continued and unremitting galvanic stimulation). As in normals, responsiveness on the part of the organism to such glucose stimulation is, moreover, measurable in diabetics by means of the insulin-sensitivity test or the glucose-insulin tolerance test in one of its several forms.^{12,13,14,18,21} A large majority of obese adult diabetics (and accordingly, therefore, most diabetics in general) are not only unresponsive to blood glucose but are also sluggish and relatively unresponsive to insulin administered by vein.¹⁴ As a result of adequate treatment, these diabetics can usually be re-converted to partial and, for practical purposes, almost to normal responsiveness to insulin and, by the same token, responsiveness to ingested glucose.^{4,5} Such renewed reactivity to glucose is in direct linear proportion to the or-

ganism's measurable improved sensitivity to insulin from without.¹⁴ Whereas well-timed and cautious administration of carbohydrate will usually stimulate the obese adult type of diabetic after "the decks" have once been cleared of unrelenting hyperglycemia, the excessive administration of extrinsic insulin can in these same patients have the opposite effect of further depressing or even suppressing the native insulin-producing mechanism. Evans and Haist¹⁰ have demonstrated this suppressive phenomenon on the islet tissue of growing rats as have McJunkin and Roberts.²⁰ In 1942 Mirsky²¹ and his associates called attention to the same principle clinically. It has, moreover, been observed by all practitioners, even if the significance has not always been fully appreciated, that progressively increasing needs for extrinsic insulin occur in individuals who are carelessly treated from a dietetic standpoint or who are lavishly and vicariously exposed to excessive insulin from without. These patients had been primarily suffering only from a *relative* insufficiency of insulin which could usually have been corrected by reducing the excessive insulin demands by proper dietary and weight control (with or without insulin). By dietary inebriety with its attendant excesses of extrinsic insulin, these patients are gradually and insidiously converted by attrition or by suppression or both into cases of absolute insulin-insufficiency (Fig. 2), with function irretrievable to the exact extent that the *absolute* defect has replaced the *relative*. In the juvenile type of diabetes which is, accordingly, essentially a different disorder from typical adult diabetes, the state of absolute insufficiency rapidly supervenes. In these patients, the extent of the absolute defect is indirectly measurable by the same glucose-insulin tolerance test, but in this case, in contrast with the obese adult with a predominantly relative insufficiency, the juvenile type of patient instead of decreased responsiveness shows as in other hormonal absolute insufficiency^{15,16} excessive responsiveness or sensitivity to insulin. Bornstein⁷ has correlated low insulin content (unopposed glucose lowering factors) in the blood with the juvenile type of case at any age, as opposed to the obese adult diabetic who presumably carries a much larger effective blood insulin content and is, accordingly, deficient only in a *relative* sense. Lawrence^{8,17} of London has sensed the same difference clinically. Of practical

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BLOOD-GLUCOSE CURVES

Folin-Wu Method - Venous Blood

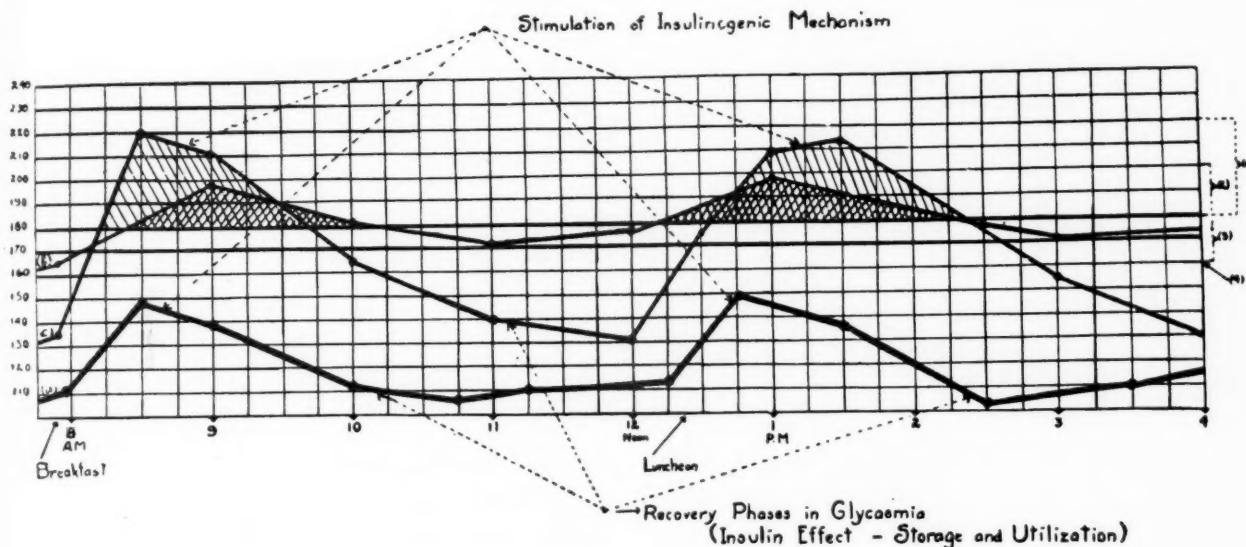


Fig. 1. (From the Brooklyn Hospital Journal)

- (a) Normal sugar curves.
- (b) So-called "mild" diabetic (10 gm. glucose in urine in 24 hours) (No recovery from hyperglycemia); *Really severe diabetes* because of chronically fatigued mechanism—no stimulation by carbohydrate or blood sugar.
- (c) Diabetic (same) under reasonably good sugar control (despite increase to 25 gm. glucose in urine in 24 hours). Patient on stimulating type of diet—ante-cibal and postabsorptive recovery periods each day. Note that curves are parallel with those of normals, but at a higher level.
- (1) 25 gm. glucose in urine in 24 hours.
- (2) 10 gm.
- (3) Higher thresholds for glucose in diabetes.
- (4) Normal threshold limit.

clinical importance, however, is the fact that as the relative insufficiency is superseded by an absolute deficiency, the patient becomes more and more sensitive^{4,5,14} in his response to extrinsic insulin, until finally he becomes extremely unstable and unpredictable in all of his responses to insulin, a condition labelled by Woodyatt as the "brittle state." In the absence of demonstrable liver pathology or of clinically apparent hypophyseal or adreno-cortical insufficiency, the clinical development of the "brittle state" in a diabetic can safely be interpreted as heralding in the existence of a marked *absolute* insulin insufficiency in that patient. The essayist has observed a number of such individuals²⁷ in whom, on extensive postmortem tissue section, no islet tissue at all could be found. Whereas the diabetic patient with a *relative* intrinsic insulin deficiency can usually be rehabilitated by measured dietary stimulation after having reduced the load-demand for insulin, the patient who has developed a pre-

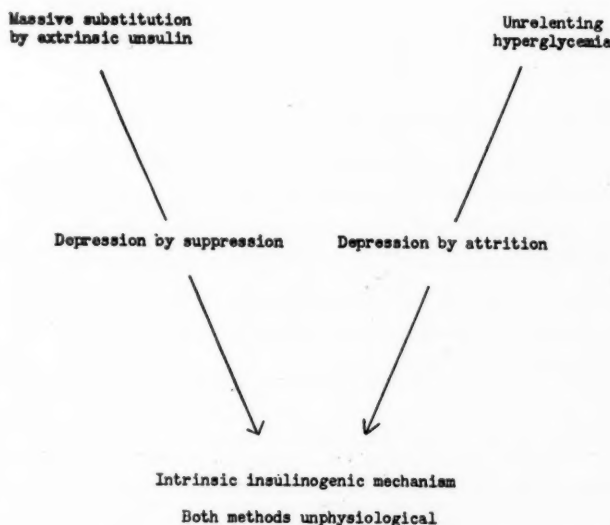


Fig. 2. (From the Brooklyn Hospital Journal).

dominant *absolute* insufficiency has already become a lost cause so far as possible intrinsic rehabilitation is concerned. It would seem obvious that further stimulation by glucose of an already

FUNCTIONAL REHABILITATION IN DIABETES—ANDERSON

oversensitive intrinsic* mechanism would in these patients constitute a therapeutic contraindication. They must of necessity be surrendered to total

the long neglected overinsulinized adult type who has progressed to the state of extensive absolute insulin insufficiency.

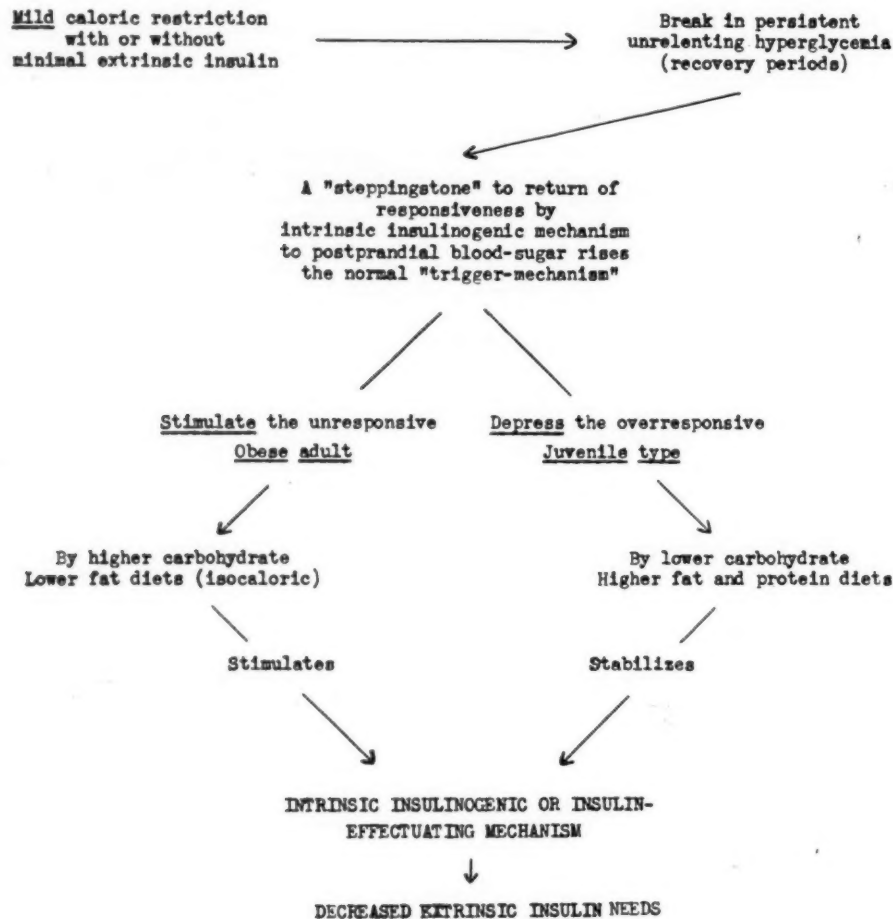


Fig. 3. (From the Brooklyn Hospital Journal).

insulin substitutional therapy from without. Their need is for stabilization (Fig. 3) rather than for stimulation. Stabilization of sensitivity can readily be accomplished by moderate dietary restriction of carbohydrate together with liberalization in protein and fat. Fortunately, this category of patients represents only about 15 per cent of all diabetics—for the most part the juvenile type or

*The essayist has advisedly referred to "stimulation" or "depression" of the insulinogenic mechanism rather than of the beta cells themselves, since it has not been unequivocally proven which of the component factors of the mechanism are the direct targets of such stimulation or restraint. The phenomenon of stimulation is well recognized, however, and has been well established by the author and his associates in observations on over five hundred diabetic patients. This fact transcends in practical importance the academic considerations of the pathways, which must await future exploration. The *fait accompli* itself must stand unchallenged in view of the consistency of favorable results obtained.

Rehabilitation

Having fixed these premises in mind, the physician has open to him a wide field for constructive rehabilitation in accordance with a sound engineering technique rather than with a pointless "hit and miss" approach to treatment limited ideologically to correcting only a sign of the basic disorder, the persistent hyperglycemia. Functional rehabilitation attacks not merely the sign but the basic disorder which has created the sign. The medical attendant, accordingly, must heroically break up the unrelenting hyperglycemia only as a means, however, to the ultimate end of intrinsic rehabilitation. He achieves this correction of hyperglycemia by carefully mapping out a diet, the most important fact of which is the prescription of a caloric allowance which initially is critically balanced precisely at the individual's

FUNCTIONAL REHABILITATION IN DIABETES—ANDERSON

basal fuel needs. If the patient is overweight, his caloric intake is, accordingly, calculated to have him lose weight slowly but steadily; if the body-

ditional burden imposed on the intrinsic insulin-producing mechanism of having to polymerize into depot fat²⁶ the small carbon fragments of any

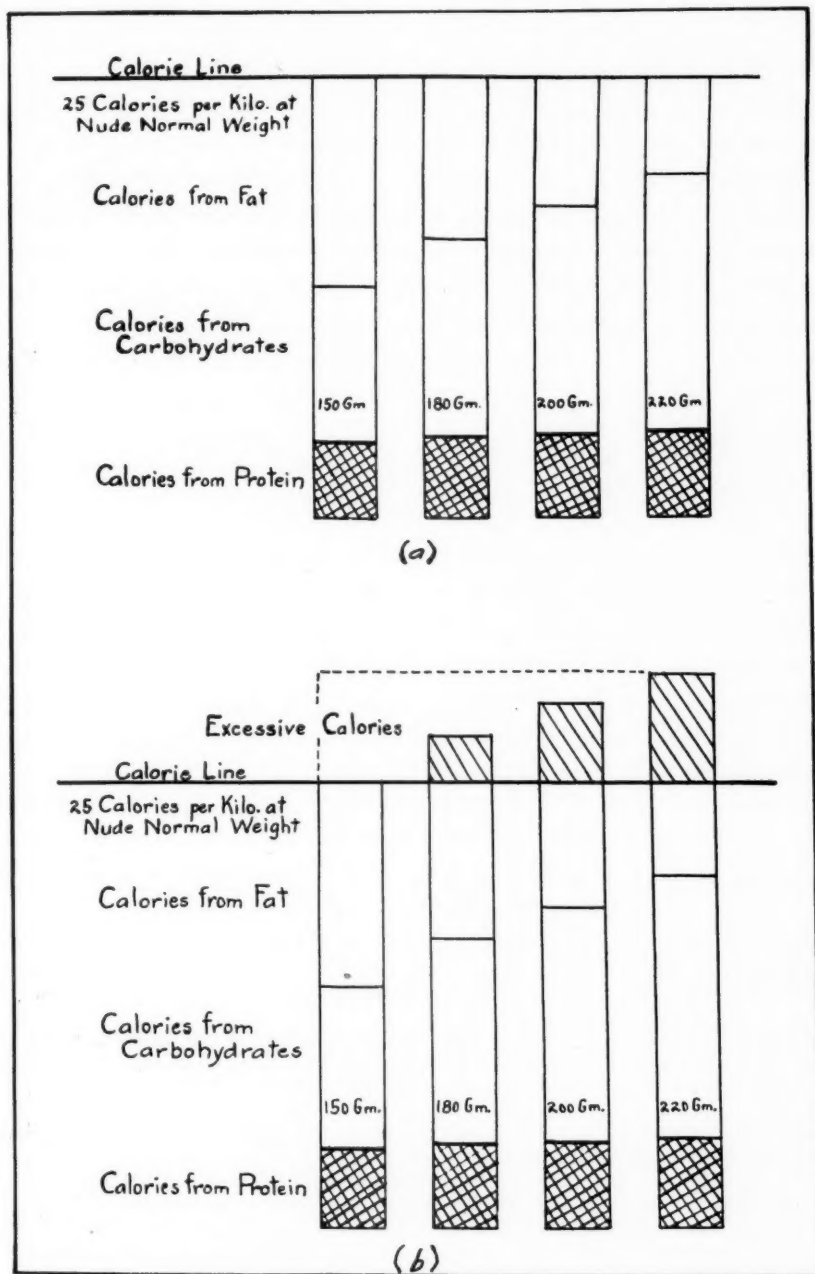


Fig. 4. (From the Brooklyn Hospital Journal).

weight is normal or within 15 per cent below normal, the diet prescription should permit of no further gain in weight whatsoever. Unless the patient is painfully undernourished, initial dietary treatment should permit of no weight gain. Usually twenty-five calories per kilogram at the individual's normal nude actuarial weight will meet this end. On this regimen, the possible ad-

excessive fuel intake is foregone. At the same time, the carbohydrate moiety of the diet is initially kept below an effectively stimulating dose, namely 150 gm. or less daily. The ineffective stimulus, that of unrelenting hyperglycemia, must be broken at any cost. If in spite of the above dietary measures, gluconeogenesis persists (as is suggested by the presence of unrelenting hyper-

FUNCTIONAL REHABILITATION IN DIABETES—ANDERSON

glycemia and glycosuria in spite of weight loss and dietary restriction), extrinsic insulin must be used in carefully meted out step-ladder amounts,

the while at the expense of progressively reducing its content of fat. As the carbohydrate is thus increased, unless there is some complicating factor

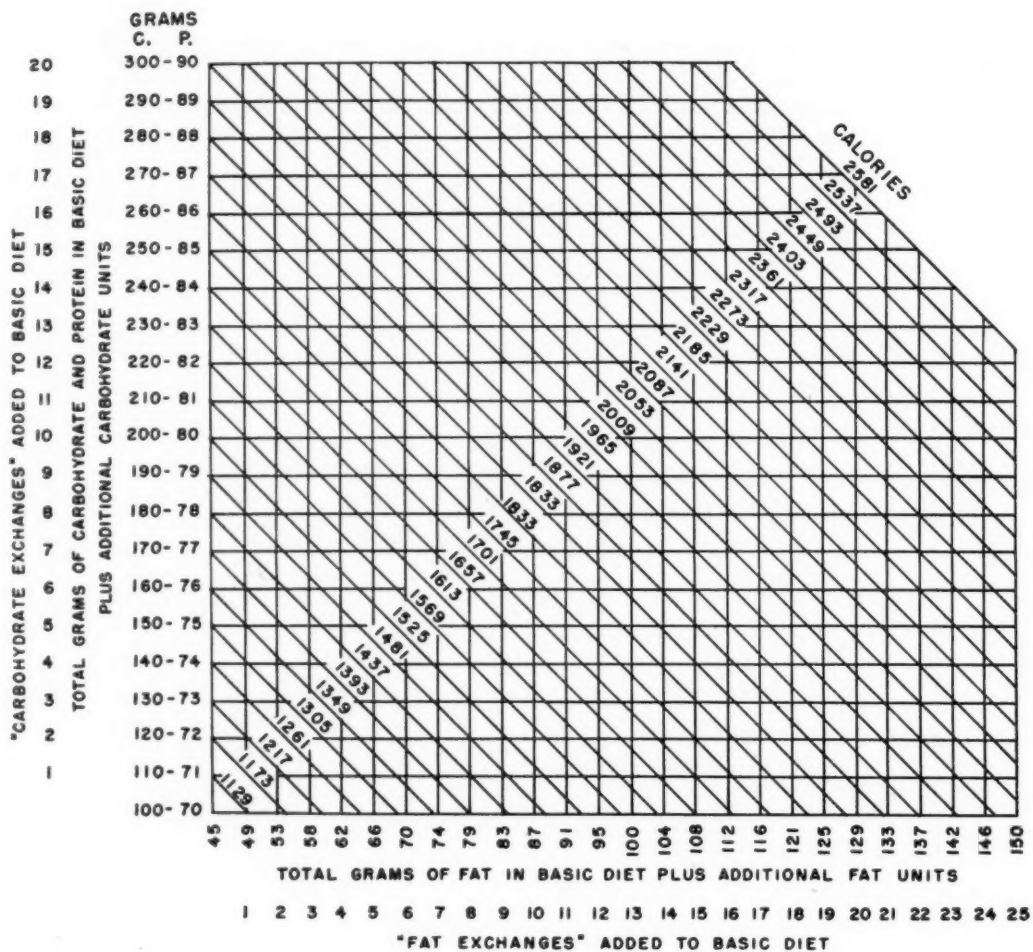


Fig. 5. (Endocrine Treatment in General Practice. New York: Springer Publishing Co., ? ? ?) The diet prescription graph is built on a "basic diet", of 1,085 calories, which is represented by the bottom left-hand corner of the graph:—carbohydrate, 100 gm.; protein, 70 gm., and fat 45 gm.

The horizontal lines from the bottom up represent "carbohydrate exchanges" (each equaling carbohydrate, 10 gm.; protein, 1 gm., and 44 calories) to be added to the basic diet.

The vertical lines from left to right represent "fat exchanges" (each equaling fat, 4.2 gm., 37.8 calories) to be added to the basic diet.

The diagonal lines represent the total caloric values of the basic diet, plus such carbohydrate and fat exchanges as may be added to the "basic diet."

The point on a diagonal line at which the horizontal and vertical lines meet on or next to that diagonal line indicates (on that diagonal line) the total caloric value of the diet represented by that particular combination of carbohydrate (including protein) and fat exchanges which has been added to the basic diet.

but always only in such limited dosage as may be absolutely necessary to "clear the decks" of the ineffective and fatiguing stimulus, persistent hyperglycemia. Having once established a consistent break in the unrelenting hyperglycemia, it is now usually possible again to stimulate as in normals the intrinsic insulin mechanism by increasing carbohydrate ingestion in step-ladder manner to 180, 200, 220 or more grams daily, however, keeping the diet religiously isocaloric all

such as hypermetabolism incidental to infection, hyperthyroidism, neoplasm, lymphoma, or temperature, extrinsic insulin needs will progressively decrease. If, on the other hand, before functional recovery has occurred, carbohydrate is stepped up by straight caloric addition of this carbohydrate to the original diet, when the total increase in calories approximates 20 per cent or more over the original allowance, persistent hyperglycemia and glycosuria will usually reappear (Fig. 4). The

control of these resumed and undesirable signs will usually require heroic increases in extrinsic insulin, a backward step, for functional recovery will then have given way to progressively increasing insulin requirements. The "isocaloric diet" must, accordingly, necessarily be retained during this period of rehabilitation or until such time as the insulin dosage has been reduced and stabilized at the patient's absolute minimal needs for insulin. Thereupon, a slow buildup of dietary fat to meet optimal balanced caloric needs for that patient will usually be tolerated and usually without additional insulin, provided, however, weight gain is not countenanced or, at least, kept very slow.

For the juvenile type of diabetic, the individual who is already unduly sensitive to insulin, whether in a child or an adult, the same initial technique is employed. Protein intake is, however, liberalized to 1.5 or 2 gm. per kilo. When "the decks" have been cleared of unrelenting hyperglycemia (i.e., recovery periods in blood sugar before meals have been achieved) stimulation by abundant carbohydrate is carefully avoided, its being preferable to keep the carbohydrate dosage within the neutral zone of about 150 gm. or at most 180 gm. (only a mildly stimulating dose).

Stimulation by Carbohydrate

What constitutes a "stimulating" intake of carbohydrate? Response by the adult type of diabetic to the stimulus, ingested carbohydrate, even with functional improvement, is, of course, usually less delicate than it is in the normal non-diabetic individual. Whereas the normal individual retains his normal insulin sensitivity on an intake of 100 gm. daily, in the adult type of diabetic 150 gm. is usually insufficient to act as an effective stimulus (or in other words, is near to the neutral point). It has repeatedly been demonstrated in the Teaching Clinic of the Brooklyn Hospital³ that above this level stimulation does occur as this can be measured by the insulin sensitivity test, but always provided the total caloric intake is kept carefully adjusted at the basal requirements of the patient. When stimulation is desired, carbohydrate is gradually stepped up to from 200 to 250 gm. daily, always at the expense of the fat moiety of the diet. The success of the Rabino-witch²² dietary regime in all probability hinges largely on its restricted fat and, accordingly, caloric content.

As F. M. Allen's² original fundamental work has so well indicated, insulin needs in an individual are more a function of the total caloric ingestion than of the absolute carbohydrate value of the therapeutic diet. If heed is not given to the total caloric value of the diet, the above phenomenon of stimulation and/or rehabilitation of the intrinsic insulin-producing mechanism is completely vitiated. Neglect on the part of the clinician to appreciate that added carbohydrate may not be given as added calories has been largely responsible for failure to achieve adequate stimulation and rejuvenation of the patient's own intrinsic insulin-producing mechanism.

Addendum

From a practical standpoint, the above principles can be put into effect by creating a "basic diet" of carbohydrates, 100 gm.; protein, 70 gm., and fat, 45 gm., to which may be added in accordance with the "Diet Prescription Graph" (Fig. 5) "Carbohydrate Exchanges," each of 10 gm. value, or "Fat Exchanges" each of 5 gm. value, or both. It is obvious that if the diet is to be kept "isocaloric" with reciprocal readjustments of carbohydrate and fat, the clinician should for his convenience have some sort of flexible diet-prescription method. To this end, the Metabolism Group at The Brooklyn Hospital has produced the graph presented in Figure 5 as well as a small "Diet Prescription Booklet" which is presented by the physician to the patient.**

Conclusion

Diabetes is a group of syndromes with a common sign, sustained hyperglycemia. All of these syndromes are associated with insulin insufficiency, either relative or absolute. There is a great fundamental and clinical difference between relative and absolute insulin insufficiency. The rationale of therapy depends on which type is in predominance. Intrinsic insulin function can largely be rescued in proportion as the relative deficiency overshadows the absolute. This should be exploited clinically. A regime of methodology has been presented.

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(Continued on Page 1087)

**Both of these are published by Spring Company of New York City.

The Art of Using the Insulins in Treatment of Diabetes

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IT IS THIRTY years since insulin was made available for the treatment of diabetes mellitus and it might be well to briefly review the history of its use since 1923 until the present time. The first insulin, now known as unmodified insulin, was produced in one strength, H-10 and had a rather rapid action but its useful duration was only about six hours so that multiple daily doses, usually two to four, were necessary for control of the disease. The first change in this insulin was an increase in the potency of the unit by about 30 per cent to its present U-unit strength.

This unmodified insulin was in sole use until 1936, when protamine zinc insulin became available and for the first time, it was possible to control some cases of the disease by one dose of insulin daily. However, protamine zinc insulin has two disadvantages when used as a single dose treatment. While its span of action is somewhat over twenty-four hours, the onset of its action is so slow that hyperglycemia is apt to occur for from two to four hours after its injection unless the first meal, usually breakfast, is greatly restricted in carbohydrate content. Its second drawback is the fact that its blood sugar-reducing action extends to practically the end of twenty-four hours and early morning hypoglycemic reactions are prone to occur unless a bedtime carbohydrate feeding is taken.

Globin insulin became available in this country in the late 1930's after having been used for some time in Canada and Great Britain. It is an intermediate insulin, having an action of from fourteen to twenty hours and has some advantages over protamine zinc insulin. Its action is more prompt in appearing after injection and its blood-sugar reducing action wanes after the above interval, thereby obviating the risk of early morning reactions. However, in a case of any severity, this waning effect during the night leads to high fasting blood sugar readings and the patient has a poor start on his day. It is useful in cases requiring small dosage and, sometimes in very young patients. One other disadvantage is the

likelihood of hypoglycemic reactions in late afternoon.

Zinc insulin crystals was later made available and its action is much the same as unmodified insulin, though its duration of action is slightly longer. In general, these insulins may be used interchangeably.

Thus, by 1940, we had four insulins at our command but none of them was entirely satisfactory. Various attempts were made to combine protamine zinc insulin with booster doses of unmodified insulin or two daily doses of globin insulin were given. Dr. Collip and others experimented with mixing protamine zinc with unmodified or crystalline Insulin in various proportions in one daily morning injection. They found that many cases were rather well controlled by a single dose of these mixtures in a ratio of one unit of protamine zinc insulin to two units of one of the above insulins. While it was rather tedious to mix the two in the syringe, most patients did so without difficulty.

This was in general so satisfactory, that it seemed desirable to produce an insulin with an effect approximating that of this 1:2 mixture. In 1950, the result of this work, NPH Insulin became available and has, to a great extent, replaced all of the earlier insulins in common use. In the usual case of mild or moderately severe diabetes, this insulin is quite satisfactory if properly used.

In treating all cases of diabetes, the diet and its distribution through the day are vitally important while using any insulin. In using the 1:2 mixture or NPH Insulin, it is advisable to allow 20 to 30 per cent of available carbohydrate for breakfast and divide the remaining 70 to 80 per cent between the other two meals. The time interval between meals is important. A factory worker, who has to take his breakfast at 6 a.m. and wait till noon for lunch, will develop hypoglycemia late in the morning unless given a small carbohydrate feeding in the middle of the morning. This usually requires only a small amount of fruit or juice. Noon and evening meals may usually be separated by about six hours without hypoglycemia developing. Bedtime feedings are usually not necessary with these insulins.

This, then is a satisfactory method in controlling the usual case of diabetes in the absence of concurrent diseases or complications of the disease itself. As is well known, these other conditions

may have a marked effect upon the blood sugar. Acute respiratory infections, gastric upsets and diarrhea are common conditions causing wide increases in blood sugar readings and require careful attention. Every patient should be instructed to notify his physician when any of these conditions occur and *not omit his insulin dosage*. It would seem logical that a patient unable to eat due to fever or nausea, should at least reduce his insulin dosage but this is not true. A persistently vomiting patient will show a rapidly rising blood sugar and development of ketones even when he has taken his usual dose of insulin. If he has omitted it, this development is, of course, much more rapid and severe.

When one of these complications occur, it is necessary to make frequent urinalyses in order to control, as far as possible, the tendency to acidosis. In the presence of glycosuria of more than a trace, booster doses of a rapid acting insulin, either unmodified or crystalline, should be given at intervals of two to six hours. The frequency and size of dose will depend upon the amount of glycosuria and the severity of the diabetes in the individual patient. Thus, the dose will vary from 5 to 20 units. Treatment of the complication is, of course, carried on concurrently.

There are several methods of controlling the disease through severe illness, postpartum or post-operative. Probably the simplest is to use one of the rapid acting insulins every four to six hours, the dose being regulated by the degree of glycosuria. This is usually quite satisfactory in patients with normal cardiorenal systems. Poor kidney function, as shown by albuminuria or high non-protein nitrogen level is apt to raise the renal threshold so that glycosuria does not occur at the usual blood sugar levels. In these cases, frequent blood sugar determinations are our only method of estimating proper insulin dosage. If glucose is to be given by hypodermoclysis or intravenously, a rapid acting insulin should be given in a dose of about 1 unit to 2 gm. of glucose.

In conclusion, it should be stated that from 25 to 40 per cent of diabetics can be controlled without the use of insulin, particularly those falling under the category of the elderly obese, whose diabetes is discovered within a few weeks or months after the onset of symptoms. For those, who do need insulin, most cases can be well controlled by a single dose of NPH insulin. A method of controlling the disease through emergencies or complications has been outlined.

FUNCTIONAL REHABILITATION IN DIABETES

(Continued from Page 1085)

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Diabetes and Tuberculosis

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THERE is little doubt that the coexistence of diabetes mellitus and pulmonary tuberculosis constitutes a formidable problem. Reviewing the therapy of these two diseases in the past ten to fifteen years, one is impressed with the radical changes that have occurred in the treatment of tuberculosis. Collapse therapy in the form of artificial pneumothorax, phrenic nerve surgery and pneumoperitoneum have yielded to long-term chemotherapy followed in selected cases by resection or thoracoplasty. Since 1947, chemotherapy and antibiotics have become routine procedures. In the field of diabetes, however, less radical changes have occurred. There has been an increased appreciation of better nutrition for the diabetic manifested by more generous protein and carbohydrate allowances in the diet. Insulin has been modified so that five types, varying in time potential, are available to be used singly or in combinations. Hence, there is a broader scope with this agent for the various grades of severity encountered in diabetes. The fundamental treatment of diabetes is still based on adequate diet and the proper use of insulin.

Only a few articles on the combined problem of diabetes and tuberculosis have appeared in the recent literature. Noteworthy among these is the comprehensive survey by Dillon, Boucot and Associates² wherein they screened 3,100 diabetics in the Philadelphia area. They found an incidence of tuberculosis of 8.4 per cent in the diabetic compared with 4.3 per cent in an industrial, non-diabetic group as controls. Melvin and Engelhardt³ state that since the contacts of diabetics to tuberculosis is no greater than that of non-diabetics, it follows that there is a more pronounced diathesis in the diabetic for tuberculosis. Banyai and Eaddin¹ report a rising incidence of the associated diseases from 1919 to 1944, and dis-

cuss theories for the increased susceptibility of the diabetic to tuberculosis. Of 115 cases, they report 47 per cent of moderately advanced improved at discharge and 53 per cent dead. In their far advanced group, 15 per cent were improved and 85 per cent dead at discharge.

This study covers 294 consecutive discharges of tuberculous diabetic patients at Herman Kiefer Hospital, Detroit, from 1940 to early 1952. This is compared with a control group of 323 non-diabetic tuberculous patients. A follow-up extending a total of twelve years, averaging five and one-half years is made in each category. The severity of the diabetes is based on the average insulin dosage during hospitalization as well as on the smoothness of diabetes control. The classification of the tuberculosis is that made on admission to the hospital.

Onset of Tuberculosis

Diabetes preceded the tuberculosis in slightly more than half: 51 per cent of living and 56 per cent of dead. Tuberculosis antedated the diabetes in only 10 per cent. Simultaneous discovery of the two diseases occurred in about a third. When analyzed for age of onset, this group was quite scattered, the majority falling between forty-five and sixty years of age. Twenty-five per cent of patients with moderate and far advanced tuberculosis had diabetes of ten to fourteen years duration. Thirty-one per cent of patients living and 35 per cent of the dead had diabetes over ten years duration. Colored patients tended to have short-term diabetes as well as tuberculosis.

Diabetes

The majority of patients were admitted with diabetes in good to fair control. Younger patients (under forty years of age) tended to have more severe diabetes based on larger insulin requirements. The severity of the diabetes in this study was not a deciding factor in the outcome since of those living at discharge, 50 per cent had severe diabetes while of those dying, only one-third had severe diabetes.

The general plan of diabetic management is as follows: If the patient was admitted with a known diet and insulin dosage, this was continued with changes made when necessary. Otherwise an initial diet of protein 80 gm., fat 100 gm., and carbohydrate 150 gm., totaling 1,800 calories was prescribed. Insulin was given according to the usual

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DIABETES AND TUBERCULOSIS—THOSTESON AND TIBBITS

TABLE I. ADMISSION CLASSIFICATION OF PULMONARY TUBERCULOSIS IN THE DIABETIC

Class	Living	Dead	Per Cent of Total
Minimal	10%	37%	7%
Mod. Advanced	44%	18%	28%
Far Advanced	46%	79%	65%

criteria for its use. The diet was then increased according to the patient's tolerance both by appetite and his ability to utilize more food. Over half the patients were underweight on admission and generally gained during their stay. An attempt was made to approximate the standard weight for height and age as often as possible. Those grossly overweight were reduced to standard levels slowly. Over the years, the diet prescriptions have kept pace with the trend prevailing throughout the country. Protein ranged from 85 to 100 gm. Two-thirds of the group received carbohydrate over 150 gm. Fat tended to be less than 130 gm. All types of insulin were used. Protamine zinc insulin alone or supplemented by a separate dose of quick-acting crystalline zinc insulin was used in well over half the cases. More recently, NPH insulin has found increased usage. Globin insulin has been effective in two doses daily. Multiple doses of quick-acting insulin predominated in the group that died because of the fickleness of the appetite and the diabetes in the critically ill patient.

In general, good diabetic control was obtained in the living and had been obtained in those who died at discharge. Difficult control was encountered in 40 per cent of those living and 43 per cent of those dying. Those patients having fulminating complications, particularly with high fever, reflected this state in somewhat more difficult diabetic management. We believe that the tuberculosis had little effect on the diabetic control in the majority of patients. Tuberculosis as an infectious process does not appear to affect diabetes as much as other non-tuberculous infections such as carbuncle, common cold, and the like.

Diabetic Complications

Cardiovascular complications such as coronary artery disease, retinopathy and renal involvement predominated in the non-tuberculous complications. Eighty per cent of those having diabetes over five years had cardiovascular manifestations. The majority in this group were over fifty years of

TABLE II. TREATMENT OF TUBERCULOSIS IN THE DIABETIC

Procedure	Living	Dead
Bed Rest only	28%	61%
Thoracoplasty	14%	8%
Resection	4% (5)	0
Pneumonectomy	1.6% (2)	.6% (1)
Other	52.4%	31%
Chemotherapy	42%	13%

* Young white woman died of postoperative alkalosis.

age. Sixteen per cent of those living at discharge had this complication compared with 24 per cent of those who died.

Coma

Coma is a waning complication of diabetes. Only seven of this group had coma on admission. More may have had it and were treated elsewhere before being transferred to Herman Kiefer Hospital. This data was difficult to cull from the histories. Despite the fact that the younger diabetics tended to have more severe diabetes, only one under fifty years of age had coma; the other six cases occurred in those over fifty. Six of the patients admitted in coma had far advanced tuberculosis and died within six months. Half of the patients admitted in coma had cardiovascular complications. Of the seven patients, four died of coma, three of tuberculosis.

Tuberculosis

Classification of pulmonary tuberculosis is presented in Table I.

The distribution in the control group is not listed since they were chosen for severity of tuberculosis in the same proportion per year as the case study group. It will be noted that two-thirds had far advanced disease. In the group dying, the far advanced cases were overwhelming. It is of interest, however, that in the living, the distribution between far advanced and moderately advanced is about even.

Patients with mild diabetes tended to have cavity formation as well as those with moderate and severe diabetes. Two-thirds of the mild diabetics had cavity formation while three-fourths of severe diabetics had cavities. Thus there is no predictable correlation between severity of diabetes and extent of tuberculosis.

Treatment of Tuberculosis

Treatment of tuberculosis in the diabetic has followed the trend mentioned above. The presence

DIABETES AND TUBERCULOSIS—THOSTESON AND TIBBITS

of diabetes did not influence the choice of procedure. Those patients requiring surgery received it. Since there usually was no emergency action required, the procedure was undertaken when the

cent of those living and 13 per cent of those dead. No deleterious effect from chemotherapy was found on the diabetic state, and no improvement in the diabetes was detected that could not have

TABLE III. DIABETES AND TUBERCULOSIS
THE EFFECT OF STREPTOMYCIN AND PARAMINOSALICYLIC ACID ON STATUS

BEFORE STREPTOMYCIN—PARAMINOSALICYLIC ACID ERA								
1940 to 1946	White Male		White Female		Colored Male		Colored Female	
	Living	Dead	Living	Dead	Living	Dead	Living	D3ad
	27	58	19	38	1	9	3	12
STREPTOMYCIN—PARAMINOSALICYLIC ACID ERA								
1947 to 1952	43	29	22	16	4	3	4	7
Total			Living		Dead			
Before			50 (30%)		117 (70%)			
After			73 (57%)		54 (43%)			

patient was in the best diabetic control under the circumstances. The distribution of procedures is listed in Table II.

The significance of Table II rests in the fact that many of the diabetics had pulmonary disease too far advanced to be eligible for surgery. Those surviving with bed rest only included patients with minimal lesions; some had moderately advanced; some had pleurisy with effusion and extra pulmonary tuberculosis. Some of these also received short courses of antibiotics. Resection by definition included wedge and segmental procedures and lobes but less than pneumonectomy. "Other" procedures included surgery for extra pulmonary disease as bone fusions, genito-urinary operations, fistulectomy, et cetera.

Chemotherapy

Chemotherapy has been used at Herman Kiefer Hospital since 1947 (the past five of the twelve years of the study), chiefly as streptomycin and paraminosalicylic acid. Isoniazid is now being used but was not available for the period covered in this report.

The early use of streptomycin and paraminosalicylic acid tended to be in selected cases—those having the most favorable prognosis, and then in short-term courses. Later it was given to every patient, and it is now appreciated that the long-term use is preferable. Twenty-five per cent of the total group received chemotherapy: 42 per

TABLE IV. DIABETES AND TUBERCULOSIS

Mortality	
TB.—Diabetes (294 cases)	Controls (323 cases)
At Discharge	
Living—55%	77%
Dead—45%	23%
At Follow-up	
Living—42%	59%
Dead—58%	41%

been attributed to the general improvement of the patient. Chemotherapy was stopped in only one instance due to eighth nerve involvement. The results of chemotherapy are shown in Table III.

Thus, prior to the antibiotic era 70 per cent of patients with combined diabetes and tuberculosis succumbed at discharge. The use of these agents has cut this mortality nearly in half. In many instances short courses of Streptomycin-Paraminosalicylic Acid were used. It is expected this figure will improve considerably with more long-term usage and the advent of isoniazid.

Mortality

The mortality findings in this study are summarized in Table IV.

Thus, the over-all death rate for tuberculoiss diabetics in this study was 58 per cent compared with 41 per cent in the non-diabetic tuberculous patients. It will be noted there is a relatively

higher cumulative mortality after follow-up in the non-diabetic patient. A possible explanation may rest in the fact that there is a tendency to retain the diabetic in the hospital longer. The few survivors among the diabetics may represent a relatively resistant group.

A peculiar finding occurred in the white male tuberculous diabetic. In the general population, diabetes in white women increases almost three to one over men after fifty years of age. It is generally known that the tuberculosis curve for both sexes rises after fifty years of age.⁴ Thirty per cent of the tuberculous diabetics were white men over fifty years whereas only 14 per cent of the controls were white men over fifty. Whites, among diabetics in this survey are presumably more predisposed to tuberculosis and this predisposition appears to occur over fifty years of age. In the colored group the patients were younger and were conspicuously absent in the over fifty group both in those living and dying.

With the trend of tuberculosis and diabetes incidence rising in the older white female, it would be expected that this situation would be reflected in the white female in this study. Since this did not appear it would indicate that the elderly white male diabetic is the present major victim of tuberculosis.

Detection of Diabetes and Tuberculosis

It was rare in this group of patients to find a diabetic among the tuberculosis patients who was so mild as to be discovered by elevated blood sugar alone. We believe that any tuberculosis patient with a history of diabetes in the family or who has been obese should be carefully investigated for diabetes. In most instances the unknown diabetic in this group was detected because of glycosuria.

On the other hand, the diabetic at all times

should be checked for tuberculosis. This means a tuberculin test at least annually in the younger patients and ideally an annual chest x-ray in the adult. Unexpected weight loss, temperature elevation, cough or unexplained loss of control in the diabetic demands an x-ray of the lungs. The occurrence of coma or ketosis in the diabetic, whatsoever the cause, demands a chest film regardless of how recently one may have been taken.

Summary

A study of 294 tuberculous diabetic patients is presented.

Whites among diabetics are predisposed to tuberculosis especially the older men.

Good diabetic control was achieved in 75 per cent of the group.

Tuberculosis had relatively little effect on the diabetic status except during fulminating complications.

The majority of those dying had far advanced tuberculosis on admission.

The diabetic patient received full benefit of current treatment for tuberculosis.

Chemotherapy has reduced the mortality in the tuberculous diabetic patient by nearly 50 per cent.

The over-all mortality was 58 per cent for the diabetic compared with 41 per cent for the non-diabetic with tuberculosis.

A high index of suspicion for tuberculosis is mandatory in all diabetics.

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NEED FOR MODERN METHODS IN TUBERCULOSIS CONTROL

Notwithstanding the reductions in tuberculosis mortality, there is a sizable task ahead before the disease may be considered completely under control. This task would be facilitated if some community in which the disease is still a major problem undertook a project to show how this could be done most effectively under

present conditions. The methods evolved should be capable of utilization widely, very much as the Framingham Demonstration set the pattern over thirty years ago. —LOUIS I. DUBLIN, A 40-Year Campaign Against Tuberculosis, Metropolitan Life Insurance Company, 1952.

The Kimmelstiel-Wilson Syndrome

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IN 1936 Kimmelstiel and Wilson demonstrated the pathological findings at autopsy of kidneys presenting unusual glomerular lesions. Seven of the eight patients had a clear-cut history of diabetes mellitus. This disease, though not determined in the eighth case, could not be definitely ruled out. The kidney lesions were described as spherical-shaped nodular masses of hyaline material occurring in the center of the glomerular lobules. These investigators considered the findings to be a pathological entity and called it intercapillary glomerulosclerosis. In the past seventeen years since this initial description a vast and often confusing literature has accumulated concerning intercapillary glomerulosclerosis, or the Kimmelstiel-Wilson syndrome, as it has become known.

The pathogenesis of the lesions, the actual pathology, the specificity of the pathological finding with relation to diabetes, and the relative importance of many of the clinical features of the syndrome are not commonly agreed upon. With these facts in mind it is the purpose of this paper to clarify some of the apparent discrepancies.

Pathology

While described by the original investigators as hyalinization of the intercapillary connective tissue, this is not considered the essential pathology today. Bell,² and, independently, Allen¹ have described the hyaline material as originating in the capillary walls from a splitting of the inner basement membrane. Bell, in fact, states that there are no connective tissue cells in the intercapillary spaces and that the glomerular capillaries are held together by the glomerular epithelial cells. Many other investigators support this view.

There are two histologic forms of the hyaline material, nodular and diffuse. Kimmelstiel and Wilson⁵ described the nodular type but the diffuse form occurs with greater frequency. Either may occur alone or both may be present in the same glomerulus. It is significant that the presence of appreciable numbers of affected glomeruli are almost pathognomonic of diabetes mellitus. Occasionally at autopsy in a non-diabetic patient there

has been reported slight involvement of the kidneys with this hyaline material, but advanced lesions have not been reported in the absence of diabetes mellitus. Further proof of the specificity of the lesion is found in its occurrence in the experimental diabetic animals of Lukens and Dohan.

The actual chemical composition of the hyaline material is unknown. The most recent work by McManus⁶ using the periodic acid Schiff's reagent seems to indicate that the hyaline material originated in the blood and is probably deposited during the process of filtration. Other recent investigations identify the hyaline as a mucopolysaccharide. This material has been shown to be different in chemical composition from the hyaline masses so frequently seen in the pancreatic cells of diabetic patients. Further, it has been shown not to be glycogen, lipid or amyloid. It closely resembles, if it is not identical with, the material seen in the sacular microaneurysms of diabetic retinopathy.

Kimmelstiel-Wilson renal lesions are found in about 17 per cent of all diabetics. The incidence is two to one in women as against men. It practically never occurs in the first two decades. Most often the lesions have their onset after thirty and reach a maximum incidence between fifty and sixty years of age.

The Clinical Findings

At the time the pathological lesions were first described as an entity, it was felt that associated with the microscopic renal changes there was a specific clinical picture. This is illustrated by the following quotation from the original article of Kimmelstiel and Wilson. "The clinical picture appears in fact to be almost as characteristic as the histological one: the patients are relatively old, hypertension is present, usually of the benign type, and the kidneys frequently show signs of decompensation; there is a history of diabetes usually of long standing; the presenting symptoms may be those of edema of the nephrotic type, renal decompensation, or heart failure; the urine contains large amounts of albumin, and there is usually impairment of concentrating power with or without nitrogen retention."

In direct opposition to the view quoted above is that of Siegal and Allen⁹ who found no constant clinical picture associated with the Kimmelstiel-Wilson lesions in the kidney. They felt, however, that occasionally symptomatology may be distinctive enough to warrant the diagnosis.

KIMMELSTIEL-WILSON SYNDROME—SEGAR

The experience of Bell of Minnesota expresses the feeling of the majority of observers. He found that the presence of hypertension and uremia in a diabetic patient usually justifies the diagnosis of intercapillary glomerulosclerosis.

There is a constant search for refinements in diagnosis that will allow the clinical recognition of this syndrome. The New York group of Rifkin, Leiter and Berkman⁷ lay great stress on the study of the urinary sediment. Frequently the sediment shows doubly refractile droplets in renal cells or casts containing cholesterol esters in addition to neutral fats. These investigators found anisotropic cells and casts in forty of forty-four cases in which the clinical diagnosis of the Kimmelstiel-Wilson syndrome was made. Histologically at autopsy doubly refractile material was found in the renal tubular epithelium of all four cases in which it was not seen in the urinary sediment. The amount of doubly refractile lipid material varies from day to day. A rather careful search is necessary to demonstrate the material. Anisotropic substances are poorly preserved and difficult to show in alkaline urine. They are best exhibited in a concentrated acid urine. Careful examination of many urinary sediments from patients with a variety of kidney ailments was undertaken. These included many conditions often found associated with diabetes mellitus, such as urinary tract infections, generalized arteriosclerosis, and hypertensive cardiovascular-renal disease. In no instance was doubly refractile lipid material present. While this material is undoubtedly encountered in most cases of intercapillary glomerulosclerosis there are also other conditions in which it is present. These include all cases of the nephrotic syndrome whether due to glomerulonephritis, lipid nephrosis, lues, or thrombosis of the renal vein. Certainly the presence of anisotropic material is not pathognomonic of the Kimmelstiel-Wilson syndrome. Some recent investigations of electrophoretic patterns of serum proteins give promise of being of diagnostic value. Ten patients with clinically suspected intercapillary glomerulosclerosis, of whom six subsequently came to autopsy with confirmation of the diagnosis, were studied and all showed a significant elevation of the Alpha 2 globulin peak with a decrease in the albumin peak. This was not present in diabetes mellitus in which there were no kidney lesions. The results are similar to those found in the well developed nephrotic phase of glomerulo-

nephritis. In this latter disease, however, the gamma globulin is decreased which did not obtain in the ten cases studied. Obviously, more work must be done before significant conclusions may be drawn, but the results in the studied cases are suggestive.

When all of the clinical features of severe nephrosis with renal failure are present in a patient who has had diabetes mellitus for many years, it is presumed that the patient's kidneys will present on microscopic examination the nodular or diffuse hyaline changes of intercapillary glomerulosclerosis. This occurs in only about 6 per cent of all cases of the syndrome proved at autopsy. The clinical diagnosis cannot be established with certainty in the absence of any of the individual findings. Hypertension, edema, albuminuria, hypoproteinemia, diabetic retinitis, and arteriosclerosis may be individually present in patients with diabetes without the findings of glomerulosclerosis. To label every case of proteinuria in a diabetic of long standing as a likely case of Kimmelstiel-Wilson disease will lead to a large percentage of errors.

An interesting feature of the development of the severe renal lesions of this disease is the clinical improvement of the affected patient's diabetes. This has been recognized a number of times. It has been commented on frequently but no adequate explanation has been offered. Often these patients show a marked diminution in their need for insulin. That this is not merely an evidence of glomerular failure where glucose is not filtered out of the blood stream, is shown by an actual fall in the blood level for glucose. The diabetes is truly ameliorated though it does not completely disappear.

Some recent investigative work offers a possible solution for this anomaly. While studying the fate of insulin in the body and attempting to find its site and mode of action it was noted that this hormone was concentrated in large amounts in the liver and kidney of experimental animals and there destroyed. This was ascertained by labeling insulin with radioactive iodine, I-¹³¹, at the tyrosin rings and testing for its localization in the body. Because the renal function is markedly diminished in advanced intercapillary glomerulosclerosis it was felt that insulin which is destroyed in appreciable amounts by the normal kidney was not disturbed. Thus this insulin is allowed to exert its effect in the peripheral utilization of carbohydrate.

Treatment

The treatment of intercapillary glomerulosclerosis is completely unsatisfactory. In our present knowledge there is no known method of reversing the hyaline changes in the kidney. Engelberg, working in Gofman's laboratory, studied seventeen cases of clinically suspected glomerulosclerosis from the standpoint of the presence of abnormal amounts of SF 10-20 lipoproteins on ultracentrifugation of the serum. Five of these cases subsequently died, and were autopsied proving the diagnosis. He became interested in this investigation because of the presence of a large number of patients with Kimmelstiel-Wilson syndrome showing high blood cholesterol as well as arteriosclerosis and doubly refractile bodies in the urine.

He found marked elevation of the SF 10-20 class of lipoproteins in all the patients whom he studied with the Kimmelstiel-Wilson syndrome. A large percentage of these patients also showed elevation of the SF 20-35 class of lipoproteins. From this data it was suggested that these classes of lipoproteins may play a role in the production of the lesion. It was further suggested that elevation of SF 10-20 proteins may be an early finding by means of which the development of glomerulosclerosis might be predicted. From this data the therapeutic use of intravenous heparin in doses of 100 mg. daily for long periods of time might be tried. It has been shown that heparin used in this manner has reduced the amount of SF 10-20 lipoproteins in the blood.

In the absence of specific therapy, symptomatic care and supportive management of the patient is indicated. This includes, of course, the usual management of cardiac failure, hypoproteinemia, hypertension, edema, albuminuria, retinal changes, peripheral vascular disease, and uremia, as well as the necessary treatment for the control of carbohydrate metabolism. Diet may become a difficult problem in cases requiring low salt and high protein as well as restriction of carbohydrates.

Digitalis is used where indicated.

Mercurial diuretics may be used as long as they are effective. Acid salts such as ammonium chloride may be of value in the absence of acidosis. Rutin, hesperidin, and other substances of this type have not been particularly useful. The outlook in the fully developed syndrome is bad and patients die within a relatively short time, usually not more than two years.

Comment

As the medical profession has become familiar with the syndrome of intercapillary glomerulosclerosis there has been a tendency to label all cases of renal abnormalities in a diabetic as Kimmelstiel-Wilson disease. This results in large percentages of error from the clinical standpoint. The diabetic may suffer any form of renal disease which may occur independently of or in conjunction with intercapillary glomerulosclerosis.

Pyelitis, glomerulonephritis, lipid nephrosis, renal malformations or tumors are often seen in association with diabetes. Acute necrotizing papillitis is a severe renal lesion which when present is practically always associated with diabetes mellitus. This lesion does not show the glomerular pathology of Kimmelstiel-Wilson disease.

The hyaline changes in the glomerulus when present in advanced degree are pathognomonic of diabetes mellitus. These changes may be suspected clinically when a patient with diabetes mellitus of long duration presents a full blown picture of nephrosis. In the absence of these clinical findings the presence of isolated evidences of renal disease can only alert the examiner to the possibility of intercapillary glomerulosclerosis, but in no sense is the clinical diagnosis certain.

Summary

1. Some of the features of intercapillary glomerulosclerosis are discussed from the standpoint of history, pathology, pathogenesis, clinical findings, prognosis and treatment.
2. It is pointed out that this is a pathologic entity rather than an easily recognized clinical syndrome.
3. The structural histologic changes can be predicted with a fair degree of accuracy in the presence of the full blown nephrotic syndrome. This occurs in a relatively few cases.

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(Continued on Page 1111)

Fructose Metabolism in Diabetes

Clinical Applications

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A LONG STANDING controversy has existed regarding the desirability of administration of glucose early in the management of diabetic acidosis. Those who have advocated its use^{1,9,10,14,19} have insisted that the prime aim of therapy is rapid restoration toward normal of carbohydrate metabolism, thus reversing quickly the ketotic process; and that to accomplish this purpose glucose must be restored to the carbohydrate-starved body. A very recent study¹⁷ supports their contention that administered glucose plus insulin produces a faster fall in blood ketones than does saline and insulin. These groups of investigators persist in their belief that glucose is superior to saline early in the treatment of ketotic acidosis.

On the other hand, those who oppose the early use of glucose claim (a) that it increases insulin resistance¹⁶ and (b) that it prolongs hyperglycemia, thus perpetuating glycosuria and polyuria which in turn lead to continued and life-endangering dehydration of the patient.⁸ This side does not claim, therefore, that saline is *better* than glucose in the reversal of ketosis *per se*, but rather that saline is *less dangerous* than glucose during the initial hours of treatment. An important reason for the continued lack of agreement is that each side has been arguing a different issue. Actually, the choice has really depended upon whether one prefers the advantages of early administration of glucose more than he fears its disadvantages.

A solution of this controversy is now at hand. Recent intensive investigation of the metabolism of fructose in normal subjects and in diabetics reveals, among other things, that the use of fructose early in the treatment of diabetic acidosis yields all of the advantages of glucose with none of its disadvantages. The purpose of this review is to summarize briefly and simply these studies

on fructose metabolism, particularly as they apply in the treatment of diabetes and diabetic ketosis.

When ordinary cane sugar, the disaccharide sucrose, is hydrolyzed it is split into equal parts

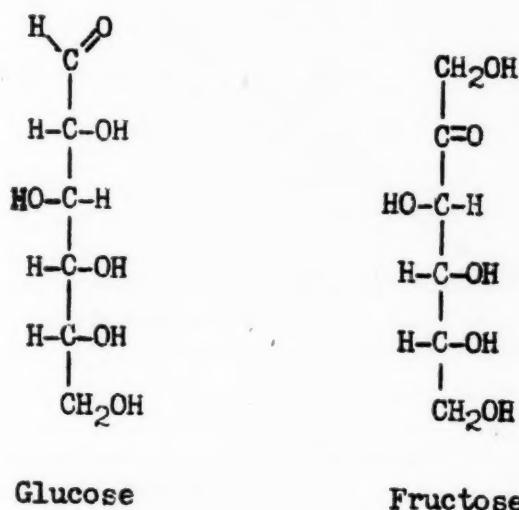
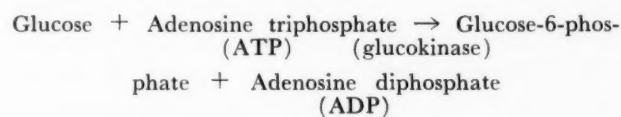


Fig. 1. Structural formulae of glucose and fructose.

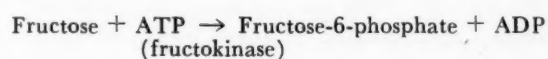
of its two component monosaccharides, glucose and fructose. These two sugars have somewhat similar structural formulae, as shown by Figure 1. However, they differ importantly with respect to an interesting step in their metabolic pathways. Briefly stated, glucose requires the presence of insulin for its utilization while fructose does not.

In 1926 Cori² demonstrated that the first step in the metabolism of glucose is its phosphorylation to glucose-6-phosphate. This reaction is catalyzed by the enzyme glucokinase:



In order, however, for glucokinase to catalyze this reaction insulin must be present. If insulin is absent, or present in insufficient quantity, phosphorylation is inhibited. Further utilization of glucose is blocked at this point.

Similarly, the initial step in the utilization of fructose is mediated by its specific enzyme, fructokinase:



The important difference, however, also reported

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FRUCTOSE METABOLISM—SELTZER AND CONN

by Cori in 1926,² is that this reaction proceeds whether or not insulin is present.

The incorporation of both glucose and fructose into the cycle of carbohydrate metabolism is

venously administered invert sugar (hydrolyzed sucrose, a 10 per cent solution of which contains 5 per cent glucose and 5 per cent fructose) produced significantly less glycosuria than a similar

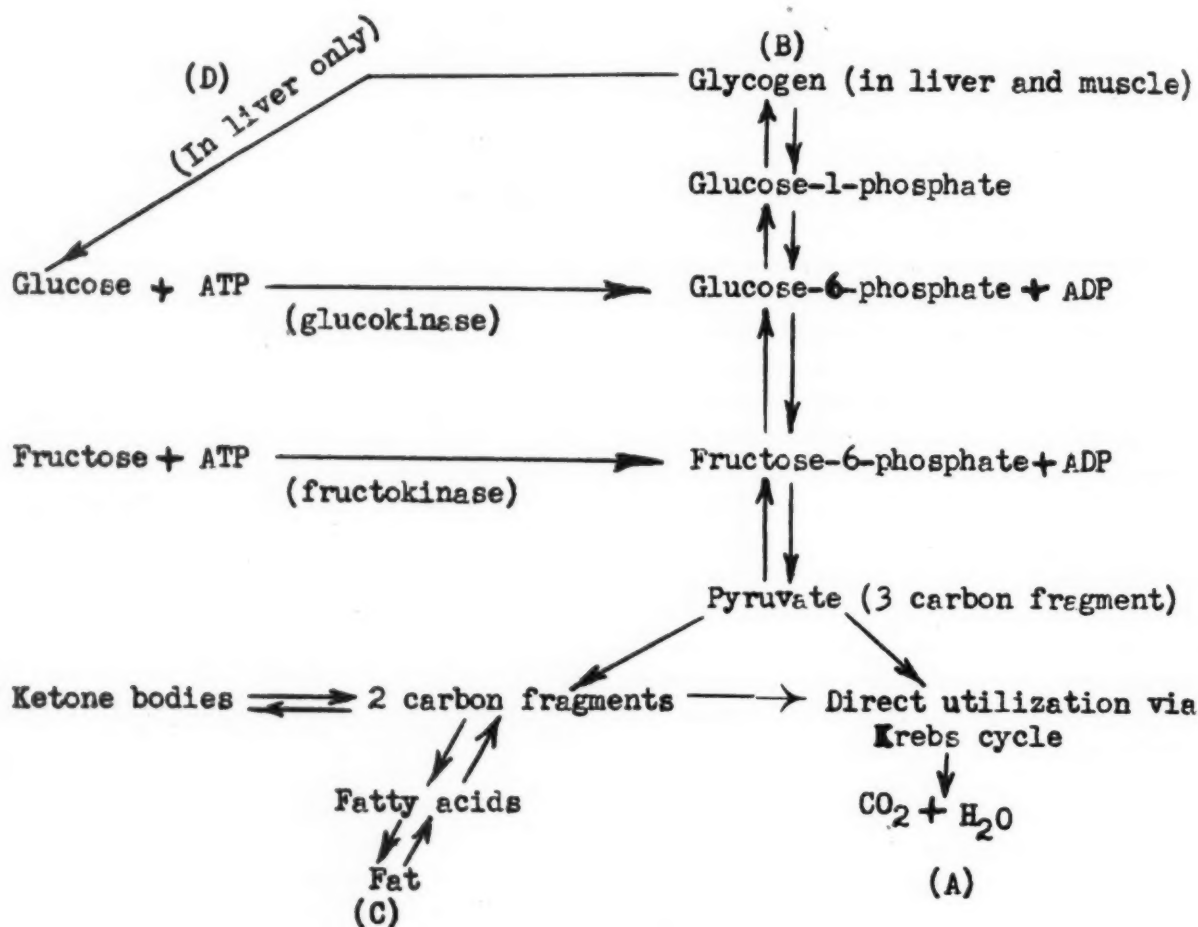


Fig. 2. Simplified scheme of cycle of carbohydrate metabolism.

shown in Figure 2. In the presence of sufficient insulin glucose is first phosphorylated and is then either utilized directly in the peripheral tissues as a source of energy (A), stored in the liver or muscles as glycogen (B), or converted into fat (C) and stored. Liver glycogen can be converted back to glucose (D) to re-enter the same cycle. At the same time fructose, even without insulin, can go through the identical cycle, including storage in the liver as glycogen. Moreover, it is known that hepatic glycogen is actually formed much more rapidly from fructose than from glucose.^{2,15,20} However, when this glycogen formed from fructose is broken down in the liver it emerges as glucose, not fructose, and insulin is then required to re-incorporate it into the metabolic cycle.

In 1950 Weinstein^{23,24} reported that intra-

concentration of glucose. In the same year Weichselbaum, Elman and Lund²² compared the rates of utilization of intravenously administered 10 per cent glucose and 10 per cent fructose. They found a strikingly increased speed of assimilation of fructose over glucose, as manifested by lower blood sugar levels, decreased glycosuria and decreased water diuresis. They were interested primarily in parenteral alimentation of surgical patients and concluded that fructose is a better utilized sugar than glucose for intravenous feeding. One of their ten patients happened to be a mild diabetic. In this patient 25 gm. of the 100 gm. of administered glucose was excreted in 1900 cc. of urine, while only 2.4 gm. of 100 gm. of intravenous fructose was excreted in 720 cc. of urine.

These preliminary findings stimulated other in-

FRUCTOSE METABOLISM—SELTZER AND CONN

TABLE I. COMPARISON OF THE EFFECTS OF INTRAVENOUS GLUCOSE AND FRUCTOSE INFUSED AT A RATE OF 1 GM. PER KILOGRAM FOR ONE HOUR INTO THREE NORMAL SUBJECTS AND FIVE DIABETIC PATIENTS.

	Intravenous Glucose			Intravenous Fructose					
	Maximum blood glucose (mg. %)	Glucose excretion (grams)	Urine volume (c. c.)	Maximum blood glucose (mg. %)	Maximum blood fructose (mg. %)	Total sugar excretion (grams)	Fructose excretion (grams)	Glucose excretion (grams)	Urine volume (c. c.)
Normals	253	6.1	1130	98	83	4.4	4.3	0.1	775
Diabetics	543	26.9	731	337	76	16.6	3.7	12.9	837

Taken from the data of Miller et al.¹⁵

investigators to more detailed comparison of the metabolism of glucose and fructose both in normal subjects and in diabetics. This work has culminated in the demonstration that fructose has much to offer in the treatment of diabetic acidosis.

Miller and his associates¹² gave alternate infusions of glucose and fructose to both normal subjects and diabetics at the rate of 1 gm. per kilogram over a sixty-minute period. As shown in Table I, when glucose was given to normals the average peak blood sugar was 253 mg. per cent, the mean excretion of glucose was 6.1 gm., and the average urine volume for three hours after the start of the infusion was 1130 cc. By contrast, fructose infused into normal subjects disappeared much more rapidly than glucose. The average maximum blood glucose level was 98 mg. per cent, the mean peak blood fructose level was 83 mg. per cent, the average excretion of total sugar was 4.4 gm. (4.3 gm. fructose and 0.1 gm. glucose) and the average urine volume was 775 cc. Miller pointed out that there is no renal threshold for fructose, since significant fructosuria was found even at blood levels as low as 4 mg. per cent. When glucose was infused at the same rate in diabetics from whom insulin had been withdrawn temporarily, the average maximum blood glucose level was 543 mg. per cent, the average glucose excretion was 26.9 gm., and the average urine volume was 731 cc. When fructose was given to these same patients the mean peak glucose level was 337 mg. per cent and the average maximum fructose level was 76 mg. per cent. However, although the average total sugar excretion was only 16.6 gm. (3.7 gm. fructose and 12.9 gm. glucose), the average diuresis was 837 cc. This failure of urine volume to parallel the decrease in total sugar excretion was unexplained. It was noted that in diabetics fructose disappeared from the blood stream at the same rate as in non-diabetics, since the blood levels of fructose and the amount of fructose excretion were essentially

the same in both groups. Most of the total sugar excretion in these diabetics, from whom insulin had been withheld, was glucose. Thus the metabolism of fructose differs from that of glucose in both normal and diabetic subjects. Further, the metabolism of fructose in the diabetic is similar to that observed in the normal person. This latter point has been established in addition by means of hepatic-vein catheterization studies.⁴

Similar findings have been reported by Smith, Ettinger and Seligson,¹⁸ who observed only minor differences between the intravenous fructose tolerance tests of normals and of diabetics from whom insulin had been withdrawn. The fructose load consisted of 0.5 gm. per kilogram infused over a thirty-minute period. Normal subjects excreted 3.8 per cent, and diabetics excreted 4.1 per cent, of the administered carbohydrate. During intravenous glucose tolerance tests, however, the normals excreted only 2.3 per cent of the infused glucose while the diabetics excreted 13.6 per cent.

Smith and his co-workers¹⁸ demonstrated in man that administration of insulin fails to influence the rate of fructose utilization, an observation made previously in animals by Cori^{2,3} and Lundsgaard.¹¹ When insulin was given to a normal subject receiving a constant infusion of invert sugar, the blood glucose level dropped sharply while the blood fructose level remained unchanged.

Weichselbaum and Daughaday²¹ were the first to report on the use of fructose in the treatment of diabetic acidosis. Four patients in severe acidosis received from 0.8 to 2.0 gm. of fructose per kilogram per hour intravenously for one to two hours. In addition to insulin these patients received fluid and electrolyte replacement. The peak fructose blood levels were 43, 63, 74 and 180 mg. per cent respectively, while the glucose blood levels did not change significantly. The rates of carbohydrate retention, based on the total sugar excretion during the infusion and for the ensuing three hours, were 49, 56, 44 and 58 gm. per hour

respectively. These workers then compared the assimilation of glucose and fructose in the complete absence of insulin by administering 0.75 gm. per kilogram of each sugar over a sixty-minute period to a totally depancreatized patient from whom insulin had been withdrawn. Fasting blood sugars ranged from 300 to 418 mg. per cent and ketonuria was present preceding each infusion. Following fructose administration the blood fructose level did not exceed 47 mg. per cent and the blood glucose rose less than 76 mg. per cent above the fasting level. Only 6 per cent of the infused fructose was excreted and the rate of carbohydrate retention was 36 gm. per hour. On the other hand, when glucose was given the blood glucose level rose to 530 mg. per cent, 78 per cent of the administered glucose was excreted during the infusion and the subsequent two hours, and glucose was assimilated at a rate of only 13 gm. per hour.

In recent months there have been several reports attesting to the superiority of fructose over glucose in the early hours of treatment of diabetic acidosis. Darragh, Womersley and Meroney⁵ used 2.5 per cent fructose in half-normal saline (each liter containing 500 cc. of 5 per cent fructose in water and 500 cc. of normal saline) as the primary replacement solution in six diabetic ketotic patients. Insulin was used in the usual manner. In all six patients a rapid reduction in blood ketone levels was observed. They noted also a faster decline in total blood sugar levels in these patients than in those who had received 2.5 per cent glucose in the early hours of treatment.

Dolger and his associates⁶ demonstrated that fructose offers a unique advantage in the treatment of diabetic acidosis in that it decreases ketone production without aggravating hyperglycemia or glycosuria. They found that in mild ketosis the administration of 100 gm. of fructose intravenously over a four-hour period was sufficient to abolish ketonuria even without the use of insulin. At the same time hyperglycemia was not appreciably increased and glycosuria actually decreased. In severe ketosis insulin was administered in addition to fructose. It was concluded that the use of fructose overcomes the objections which have traditionally been voiced against the early use of glucose. Thus, the use of fructose in the initial treatment of diabetic acidosis does not lead to aggravation of hyperglycemia, nor to

increased glycosuria, nor to further dehydration, nor to insulin resistance.

In order to determine whether the administration of carbohydrate in the early treatment of diabetic acidosis actually speeds recovery from ketonemic acidosis, Rosecan and Daughaday¹⁷ induced ketosis by insulin withdrawal and determined the rate of fall of blood ketones during insulin therapy with and without added carbohydrate. Glucose or fructose was administered intravenously at a rate of 0.8 gm. per kilogram per hour for four hours, and similarly acidotic patients as controls were given normal saline. It was found that the addition of carbohydrate to insulin in the early hours of treatment caused a significantly faster fall in blood ketone levels than when only saline and insulin were used, but that no superiority of fructose over glucose in this respect was evidenced in their small series. Fructose was once again superior, however, with respect to the speed and completeness of its assimilation, since total blood sugar was significantly higher when insulin and glucose were used than when insulin and fructose were administered. Seventy-eight per cent of the infused carbohydrate was retained when fructose was given as compared to only 32 per cent when glucose was given.

Miller, Murphy, Craig and Woodward¹⁸ studied the relative effects of glucose and fructose in the first six hours of treatment of diabetic acidosis induced by insulin withdrawal. They observed that fructose enhanced greatly the amount of carbohydrate utilized as compared with the effect of administered glucose. It was shown, further, that during and following the use of fructose, the amounts of water, sodium and potassium in the urine were not significantly greater than those of the control period during which the patient received no added carbohydrate in the treatment of ketosis.

Drucker et al⁷ investigated the effect of stress on glucose and fructose metabolism. To test their idea that the relative insulin resistance accompanying the alarm reaction should decrease glucose tolerance without affecting fructose tolerance, they performed intravenous glucose and fructose tolerance tests on surgical patients before and after operation. Similar studies were done on patients with typhoid fever while acutely ill and during convalescence. They found, as anticipated, that the stress of surgery or of an acute febrile illness does decrease glucose tolerance while fructose tolerance

remains unaltered. Failure of the stress of surgery to influence fructose utilization has been confirmed by Dolger,⁶ who reported that in the preoperative and postoperative management of diabetic patients with fructose instead of glucose, pre-existing hyperglycemia and glycosuria were not aggravated.

Summary

The fundamental goal in the treatment of diabetic acidosis is rapid restoration of normal carbohydrate metabolism. It is imperative to re-establish direct peripheral oxidation of glucose, and glycogen storage in the liver, as rapidly as possible. The degree to which this can be accomplished will determine the speed with which blood and urinary ketones disappear. It has been shown that this can be effected more quickly by using glucose from the outset than by using saline alone. However, the *improper* use of this sugar has certain intrinsic dangers because glucose, which requires insulin for its utilization, is being given to an insulin-deficient patient. This can result in prolonged hyperglycemia, glycosuria and water diuresis. A sugar which is metabolized normally in the absence of insulin would theoretically be the best carbohydrate to use in the management of diabetic ketosis.

Fructose does not require insulin either for its direct oxidation or for its conversion to glycogen. Independent studies by many investigators confirm the fact that fructose metabolism proceeds at essentially the same rate in normal subjects, in controlled diabetics, and in diabetic acidosis.

These attributes make fructose superior to glucose for use in the early treatment of diabetic acidosis because they result in greater retention and faster utilization of the administered carbohydrate. The rapid utilization of fructose confers upon it several positive advantages over the use of glucose:

- (1) Maximal blood sugar levels are lower.
- (2) Hyperglycemia subsides more rapidly.
- (3) Less total glycosuria occurs.
- (4) There ensues more rapid control of polyuria, and thus less dehydration of the patient.

In addition, administration of fructose is superior to the use of saline alone in the management of ketosis since it results in a significantly faster fall in blood ketone levels. Fructose is therefore uniquely fitted for use in the initial hours of treatment of diabetic acidosis. Since it possesses all of

the advantages of glucose with none of its disadvantages, the advent of fructose renders the old saline-versus-glucose controversy obsolete.

It is recommended that fructose be used as a 2.5 per cent solution in half-normal saline (each liter to contain 500 cc. of 5 per cent fructose in water and 500 cc. of normal saline). Higher concentrations of fructose can be used, however, without the danger attending the use of higher concentrations of glucose. When the blood sugar drops below 200 mg. per cent*, or when glycosuria disappears, the carbohydrate being infused may be changed from fructose to glucose.

The use of intravenous fructose in place of glucose seems indicated also in diabetic patients who have just undergone surgery, who have febrile illnesses, or who otherwise may be expected to manifest the insulin resistance accompanying the alarm reaction. In such situations the use of 5 per cent or 10 per cent solutions of fructose results in less hyperglycemia and glycosuria. This provides for greater retention of carbohydrate, and of total available calories, than when glucose is used. Moreover, more efficient utilization of this carbohydrate serves as prophylaxis against the development of ketosis.

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*When fructose is used, both the Folin-Wu and the Somogyi-Nelson methods of determining blood sugar yield the total blood sugar level, i.e., the blood levels of fructose plus glucose.

Michigan State Medical Assistants Society

By Mrs. Elizabeth E. Peck
Detroit, Michigan

AS THE demands upon the doctor of medicine increase daily, his need for competent and loyal office personnel increase also. To-day's practice of medicine requires more time from the M.D. than in the past as he attends meetings of his medical organizations, the postgraduate sessions, and specialty conferences, such as cancer, industrial health, et cetera. In order for him to attend these meetings and give his attention to the patients he treats, he must have assistants who are interested and properly trained to aid him.

At the invitation of the Michigan State Medical Society, the Detroit Medical Assistants Society was organized in 1940. Through their efforts the Michigan State Medical Assistants Society came into being.

The Michigan State Medical Assistants Society is composed of city or county medical assistants, each group having an Advisory Board appointed by their county medical society. The Michigan State Medical Society also appoints an Advisory Committee consisting of seven doctors of medicine who direct the activities and policies of the state organization.

The objects of the society as stated by their Constitution and By-Laws are (1) to unite, in an organization, those persons who are employed in offices, of members of the Michigan State Medical Society, hospitals accredited by the American Medical Association and medical laboratories of the State of Michigan, (2) to inspire its members to render honest, loyal, or more efficient service to the profession and to the public which they serve, and (3) to render educational and informative services to its membership.

There is no better employe than a person who feels that he is an integral part of the medical profession. As employers, doctors must compete with industry, but the traditional lure of the medical profession will still attract modern girls to seek this field of employment if they are encouraged.

The demand for special training for the assistant in the office of a doctor becomes more imperative

daily. The Michigan State Medical Assistants Society is making a sincere effort to supply speakers from the medical societies and representative companies. These speakers deal with subjects pertinent to the doctor's office and members are better informed today as a result. However, because the organization is non-profit there are not funds for extensive advertising to increase the membership. Therefore, the organization must turn to you, the doctor of medicine and ultimate beneficiary, to help with this purpose. To date there are constituent societies in Allegan, Bay City, Detroit, Grand Rapids, Lansing, Kalamazoo, Muskegon and Saginaw. In Genesee County a new society is now being organized. These cities cover only a small portion of Michigan but with your individual help and interest your medical society could sponsor a group in your county. If you would prevail upon your county officers to start such a group, they would realize the benefits to be derived and would further such a cause.

As additional help to the M.D.s of Michigan the Michigan State Medical Society has outlined an Adult Education Course for Medical Assistants. This course could be offered medical assistants in your community through the public schools. An outline for suggested procedure can be obtained from the offices of the Michigan State Medical Society and any assistance the existing society can give, it will do willingly. This course is designed to give special training to the employed medical assistant. It will increase her value as a public relations representative and give training in office procedures.

The Highland Park Junior College offers a course to students wishing to seek employment in a doctor's office. The course includes the specific training requested by the doctors in the Detroit area and is approved by the Wayne County Medical Society. It is a one-year program and gives training in office procedure, basic laboratory work and nursing arts. The demand for these graduates is so great that the college has several positions available to the student even before she serves her apprenticeship. A similar course could be started in the schools of your city if the M.D.s would show the interest required to start such a program.

Mutual benefits from these programs would make a better physician-employe relationship. The medical assistant need no longer be an unclassified

(Continued on Page 1113)

The Present State of Tonography

By Peter C. Kronfeld, M.D.

Chicago, Illinois

TONOGRAPHY is a recent refinement of an investigative technique that has been in use in ophthalmology for over twenty-five years. It consists, in principle, of the measurement of the drop in ocular tension that occurs during and as the result of an external, eyeball-indenting force. Tonometers of the Schiötz type serve both purposes, the exertion of an external, eyeball-indenting force and the measurement of the drop in ocular tension. Much of the recent interest in and progress of tonography is due to the appearance on the market of the electronic tonometer of V. Mueller. This instrument has two principal advantages over the regular Schiötz instrument, viz., greater accuracy of the readings and easier maintenance on the examinee's cornea.

The drop in ocular tension occurring while the tonometer rests on the cornea is due to the expulsion of fluid from the eye. All available evidence points in the direction of accelerated outflow of aqueous during the application of the tonometer. The possibility of some diminution in the total blood content of the eye during tonography cannot be ruled out altogether.

The computation and evaluation of the results of tonography has been greatly facilitated by Friedenwald's theoretical analysis and actual measurements of the distention, deformation and indentation of the human eyeball during tonometry. Two sets of Friedenwald's measurements have been particularly helpful in evaluating the results of tonography, viz. the data pertaining to the volume of the indentation produced by the plunger and the data pertaining to the rise in intraocular pressure caused by the application of the tonometer. With the help of these data it is possible to express the drop in tension occurring during tonography in terms of cmm. of fluid expressed per mm. of tonometric increase in intraocular pressure. This mode of expression of the tonographic result has been

advocated by Grant, the underlying concept being that the tonometric increase in intraocular pressure acts as the driving force for the accelerated outflow of aqueous. The ratio cubic millimeters of fluid expressed per millimeter of tonometric rise of intraocular pressure has become known as Grant's coefficient of the facility of aqueous outflow.

In a good many normal eyes the four or five minute tonogram is smooth enough to permit conversion into Grant's coefficient. The facility of the normal eye to give off fluid under these conditions has been found to vary within wide limits. Four independent groups of workers have reported about the same range of variations of Grant's coefficient in normal eyes, viz., from .10 to .44. The test-retest consistency of the coefficient is ± 25 per cent for outpatients and ± 10 per cent under the more sheltered conditions surrounding inpatients. A very interesting physiological disturbance of the aqueous outflow has been found to occur during menstruation (Shahan).

In less than half of the normal eyes tested the tonogram deviates appreciably from the usual smooth curve. The interpretation of some of these deviations is facilitated by simultaneous observation of the flow in the aqueous veins. Persistence of accelerated flow in the latter vessels synchronous with an absolute or relative plateau in the tonogram is suggestive of short phases of accelerated secretion or of a blood volume change within the eyeball. These processes are being studied by the writer. Irrespective of the outcome of these studies, there can be no doubt as to existence of a principal difference between a representative group of early chronic glaucomas and a representative group of normal eyes, the former being characterized by a lower coefficient of outflow than the latter. Tonography is thus of distinct diagnostic value, but certain obvious limitations must be recognized.

Since chronic glaucoma probably develops as a gradual deviation from the normal and since the normal range is very wide, a coefficient of outflow of .15 may be perfectly normal for an eye that has never had a higher coefficient; the same coefficient would probably have to be classified as pathological if the eye in question were known to have had a much higher facility of outflow on previous tests.

The low coefficient of outflow characteristic of

(Continued on Page 1105)

From the Department of Ophthalmology, University of Illinois School of Medicine.

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Shall Basic Science Laws be Repealed or Revised to Contain the Essentials of a Uniform Basic Science Act?

By J. Earl McIntyre, M.D.
Lansing, Michigan

REPEAL of any law is demanded when that law works hardships, inequalities, or fails to serve the purpose for which it was enacted.

Before commenting upon this phase of the question, I hasten to point out that the advisability of these measures relating to healing arts involves consideration, not of the convenience or personal economic fortunes of practitioners, but of the health and welfare of the people. The boards of the respective healing groups are created not to protect doctors, but to protect the public. The very thesis of basic science legislation is the screening of the unfit from the field of healing the sick. The admission of those from other states must be determined not by interstate professional pride or sectional jealousy, but by the single question—are they competent to enter our field of healing activities, whether in medicine, osteopathy, chiropractic, or other healing groups.

We must not bar the gates to a highly competent doctor from a sister state merely because that state maintains a "closed shop" for its native sons. Conversely, we should not admit an incompetent doctor from a sister state merely because that state accepts one of our doctors. This amounts to nothing more than plain horse trading and that is what the term "reciprocity" or "reciprocal" has come to mean in the minds of many.

How then can we insure the admission of the qualified doctor by a sound professional and legal test? It is the thought of many of us that the answer lies in uniformity of legislation acceptable to all or most states.

This uniformity provides the desired factor of equivalence. In other words if all or most states require examinations in the same five designated subjects, considered essentially basic, and a passing

grade or mark of the same minimum, those states will have adopted virtually equivalent standards for the granting of its basic science certificate. There seems to be little question but that the subjects of Anatomy, Bacteriology, Chemistry, Pathology, and Physiology are the essential basic sciences and that the content of the examinations and the number of questions must also be the same in all states, under the several acts.

As to states having no basic science law or to states which will refuse to adopt or conform to a uniform basic science act, we must say that public opinion would soon bring about adoption. Citizens of state A would not stand by and see its licenses in all healing arts become worthless in most other states and its sons absolutely barred from entering practices in most states. This, one may say, is boycotting of the highest order. Yet, no other solution is legally or practically possible. Waiver of the certificate to licenciates in such states would, we are told by our attorneys, impair the constitutionality of the body of the acts.

A comparative analysis of the basic science laws of the several states containing the basic points which tend to permit or prevent endorsement or waiver privileges between states was prepared and presented by a former president of your association, Doctor Madison, in his paper entitled, "Basic Science Laws, Boards, and Practices in the United States which he read before the Thirty-ninth Annual Congress on Medical Education and Licensure in 1943. I have used this paper in my research, and also his paper on a proposed uniform basic science law read before the Congress in February of 1947, and have quoted from both with his permission. In fact, my research has revealed that during the past twenty years, verbal and written statements of Doctors Bierring, Carter, DuBois, Madison and myself are so much alike in phraseology and wording that any of us could accuse the other of plagiarism.

It is obvious that we are not providing adequately for equitable distribution of our practitioners and their much-needed services. We must continue to send our medical graduates to all points of the compass to help the sick. They must be properly prepared. Also, so must the non-medical graduate whether he be an osteopath, chiropractor, naturopath, or chiropodist or optometrist who advertises or designates himself as foot or eye doctor or specialist. Once properly

Read before the American Association of Basic Science Boards at the Annual Congress on Medical Education and Licensure, Chicago, Illinois, February 9, 1953.

Dr. McIntyre is Secretary, Michigan State Board of Registration in Medicine.

prepared, as Doctor Madison has so aptly put it, they should not be held at bay at state boundaries while their mental baggage is inspected by a basic science board.

The project or task of designating and drafting a uniform basic science law to serve as a basis for all states is a large one. The act must be drawn in its basic features and approved by the office of the state attorney general in the matter of interstate endorsements or the waiver clauses.

While I do not propose to submit a formal draft of a proposed uniform basic science act, I do, however, wish to suggest the inclusion of certain essential provisions. Each state must, of course, insert provisions which are consistent with its rules, regulations, and laws governing the structure and form of statutes, such as title, repealing or amending clauses, and must also provide for enforcement and procedures for appeal in accordance with other administrative laws and practices. In some states where the several healing groups are governed by a composite board, the statute creating such composite board must be amended with reference to the basic science law. It is likewise true in the case of statutes governing the separate healing groups.

The following provisions should be included in a uniform basic science act:

1. Requiring a certificate from the basic science board showing that the applicant for licensure has passed an examination in the designated basic science subjects which I have previously named. This certificate to be issued before one is permitted to take an examination for license to practice any of the forms of the healing arts and that such certificate must be held by any person seeking to be admitted to practice by interstate endorsement or waiver privilege.

2. The healing art may be defined as follows: For the purposes of this act, the healing art includes any system, treatment, operation, diagnosis, prescription or practice for the ascertainment, cure, relief, palliation, adjustment, or correction of any human disease, ailment, deformity, injury, or unhealthy or abnormal mental condition.

Note: This definition brings within its scope non-sectarian medicine, chiropractic, naturopathy, osteopathy, sanipractic, and other modes of healing. It is inclusive enough to cover chiroprodists, dentists, nurses, optometrists, pharmacists, and others, but provisions to exempt them from the act must be included.

Note: It is suggested and urged by practitioners of the healing arts who are covered by the basic science laws, that any who practice any branch of healing as outlined by the above definition, who prefix the title of doctor or its abbreviation, or append or suffix a degree containing the word "doctor" should not be exempted from the basic science law or its board's examination; namely, chiroprodists and optometrists.

3. The provision for the creation of the board and the appointment of members may be worded as follows:

The Governor, within thirty days after this act takes effect, shall appoint a state board of examiners in the basic sciences (hereinafter referred to as the board), consisting of five members. The members of said board shall be appointed one, for one year; one, for two years; one, for three years; one, for four years; and one, for five years; from the dates of their respective appointments. On the expiration of the term of any member, the Governor shall fill the vacancy by appointment for a term of five years. On the death, resignation, or removal of any member, the Governor shall fill the vacancy by appointment for the unexpired portion of the term. Every member shall serve until his successor is appointed and qualified. The members of the board shall be selected because of their knowledge of the basic sciences aforesaid, and each member shall be a professor, or an associate or an assistant professor on the faculty of an accredited college or university approved by the Northcentral Association of Colleges and Secondary Schools or its equivalent. Each member shall have resided in () not less than one year next preceding his appointment. No member of the board shall be actively engaged in the practice of the healing art or any branch thereof.

4. The provision for examinations may be worded as follows: The board shall conduct examinations at such times and places as it deems best. Every applicant, except as hereinafter provided, shall be examined to determine his knowledge, ability, and skill in the basic sciences. The examinations shall be conducted in writing, but may be supplemented by oral examinations, and if practicable may be supplemented by examinations in the laboratory, or dissecting room.

If the applicant receives a credit of 75 per cent or more in each of the basic sciences, he shall be considered as having passed the examination. If the applicant receives less than 75 per cent in one

subject and receives 75 per cent or more in each of the remaining subjects, he shall be allowed a reexamination at the examination next ensuing on application and the payment of the prescribed fee, and he shall be required to be reexamined only in the subject in which he received a rating less than 75 per cent. If the applicant receives less than 75 per cent in more than one subject, he shall not be reexamined unless he presents proof, satisfactory to the board, of additional study in the basic sciences sufficient to justify reexamination.

5. Provision for requirement of the certificate may be as follows: No certificate shall be issued by the board unless the person applying for it submits evidence, satisfactory to the board, (1) that he is not less than twenty-one years old; (2) that he is a person of good moral character; (3) that before he began the study of the healing art, he was graduated by a high school accredited by the (insert the state accrediting agency) or a school of equivalent grade, or that he possesses educational qualifications equivalent to those required for graduation by such an accredited high school; (4) that he has a comprehensive knowledge of the basic sciences as shown by his passing the examination given by the board, as by this act required. This shall not be construed to prevent the issue of certificates under the provisions of Paragraph 6 of this act.

Note: No evidence is required of the applicant of the extent and nature of his knowledge of the basic sciences. These are to be determined by the board of examiners in the basic sciences by examination. The professional examining board to which the applicant must subsequently apply for his examination for license to practice is to be at liberty to accept the findings of the state board of examiners in the basic sciences with respect to the proficiency of the applicant in those sciences, or to re-examine the applicant in those sciences on its own account at the discretion of the licensing board.

6. The Provision for interstate endorsement or waiver may be worded as follows: The board may at its discretion waive the examination required in Paragraph 4, when proof satisfactory to the board is submitted, showing that the applicant has passed in another state the examinations in the basic sciences before a board of examiners in the basic sciences provided, however, that the statute relative to the certificate and requirements therefore is the same as in this act.

Note: You will notice that in this paper all reference to reciprocity or reciprocal has been eliminated. It has always seemed somewhat anomalous to us to condition the waiver or endorsement of an examination on the action of another state in granting a reciprocal waiver. It is not believed that such a condition has anything at all to do with the actual qualifications of the applicant. The type and content of the examination previously given does have a very important bearing on those qualifications and should be taken into consideration. In fact, the attorney general of various states has ruled that the word "reciprocity" or "reciprocal" implies a contract between states whereby they will endorse a certificate of examination by their respective examining or licensing boards which may be legally interpreted to mean that if they accept one they must accept all applicants which, of course, would be a dangerous and undesirable procedure.

7. Provision for certificate and license cancellation may read as follows: Any basic science certificate and any license to practice the healing art or any branch thereof, issued contrary to this act, is void. Any licensing board which has issued a license on the basis of a void basic science certificate shall revoke or cancel that license. The procedure for such revocation or cancellation shall be in accordance with the provisions of the act under which such license was issued, authorizing the cancellation or revocation of licenses generally. The certificate issued to any person by the state board of examiners in the basic sciences shall be revoked automatically by the revocation of his license to practice the healing art or any branch thereof.

Note: Revocation of license must not be confused with suspension; the latter can or may be reinstated without examination.

8. Provision as to prohibiting the practice of any of the healing arts without a certificate should be as follows: Any person who practices the healing art or any branch thereof without having obtained a valid certificate from the state board of examiners in the basic sciences, except as otherwise authorized by this act, shall be fined not more than () dollars or imprisoned for not more than (), or both, in the discretion of the court. The basic science certificate shall at all times be displayed in a conspicuous place in the business office or consultation room of any person who practices the healing art.

9. Provision should be made for prohibiting the

use of fraudulently obtained or forged certificate and for prohibiting the issuance of fraudulent licenses, with penalties consistent with the penal statutes in the particular state.

10. The act should contain provision for exempting certain groups as dentists, nurses, and others and the following language is suggested: This act shall not be construed as applying to dentists, nurses, pharmacists, and perhaps chiroprodists and optometrists, provided they are not legally permitted to use the title "doctor" or its abbreviations and who are practicing within the limits of their respective callings; nor to persons licensed to practice the healing art or any branch thereof in () when this act takes effect; nor to persons specifically permitted by law to practice without licenses, who practice each within the limits of the privilege thus granted to him.

Note: To meet the conditions in some states, interns and resident physicians in postgraduate training in hospitals approved by an official accrediting agency or board, may be exempted for the period of their training, not to exceed () years.

There will, of course, be other provisions which must be decided upon following co-operative study and formulated by committees appointed to prepare a proposed uniform basic science act. There are many provisions which might result in the repeal of the basic science laws. There are provisions which would defeat the purpose of the basic science legislation.

We should all seek the broadest co-operation to the end that the fundamental purpose of basic science legislation will be achieved. Petty jealousies between basic science boards and the examining and licensing boards regulating the various healing arts should be brushed aside.

The basic sciences are the elementary and fundamental sciences on which all healing is based. They are basic or common to all systems and theories of healing. Therefore, I believe that we must all admit that a basic science law is a public health law to promote better health standards and to safeguard and protect the sick public at large. A minimum standard of education for every practitioner is not to be considered as inimical to a good public health policy.

To summarize may I suggest that the answer raised in the title of this paper should be *revision* providing it includes or contains the "must clause" or essentials of a uniform basis science act which are, to recapitulate and emphasize:

1. Uniformity in name and number of subjects.
2. Uniformity or content of examinations which must include:
 - (a) Number of questions
 - (b) Time allotted each subject
 - (c) Minimum passing grade requirement

The above answers the equivalency requirement found in all basic science laws therefore will insure interstate endorsement or waiver privileges, which next to the examinations, are the most important or vital part of any basic science law. It will protect the sick public by providing and insuring better training in the basic sciences or fundamentals to all who practice the healing arts. Also, the free and rapid interchange of doctors of the peoples choice from one basic science state to another.

Unless this is brought about in the near future, I predict that an indignant public will demand their state legislatures to repeal the basic science laws that were enacted to protect their health and welfare.

THE PRESENT STATE OF TONOGRAPHY

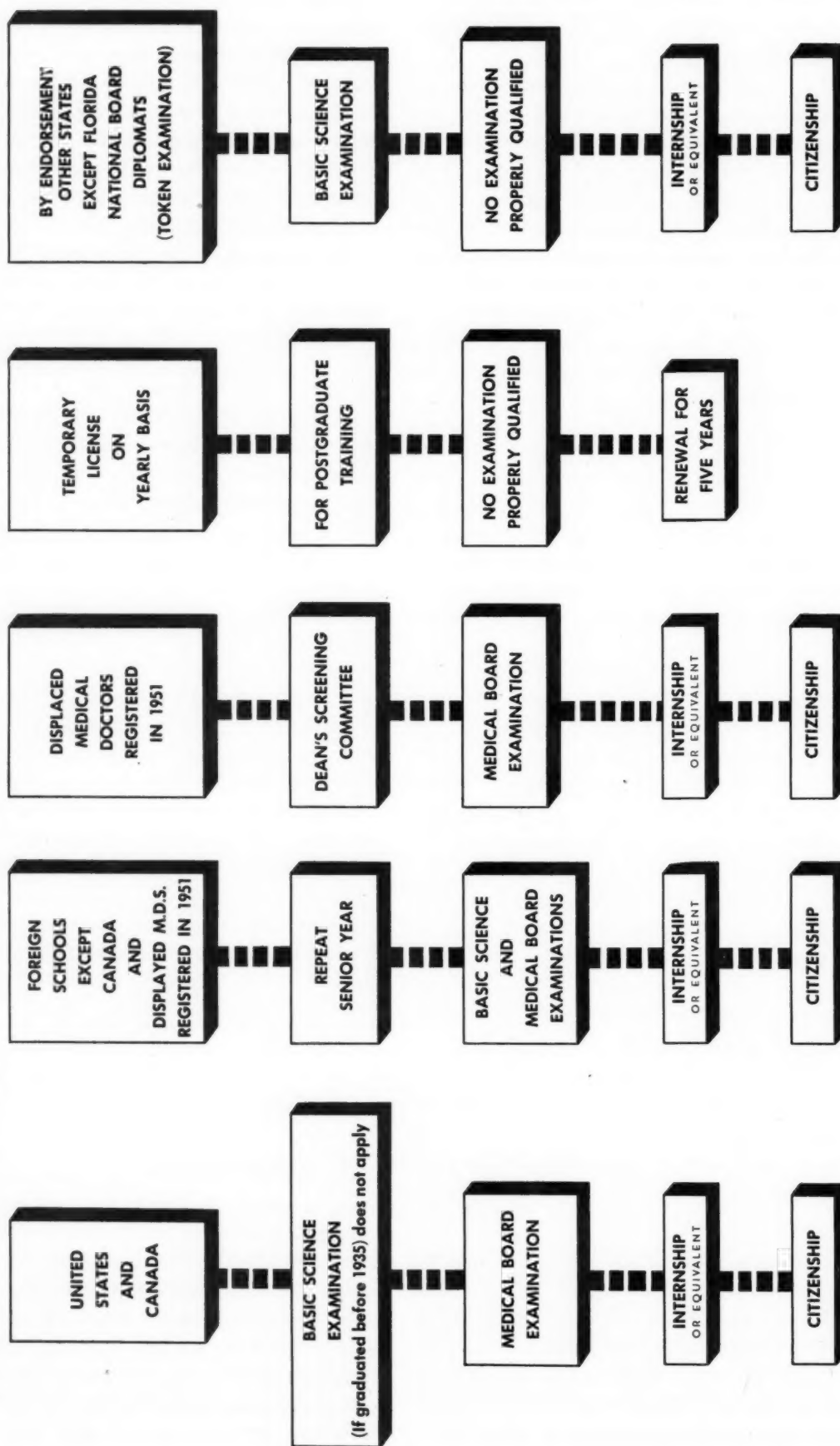
(Continued from Page 1101)

chronic glaucomas as a group lends new support to the impaired outflow theory of chronic glaucoma. The fact that miotics distinctly improve the facility of outflow in such eyes permits several interpretations. The most likely one is the assumption of more efficient outflow conditions created by changes in the vascular pressures in the anterior

uvea and thereby also in the deep scleral plexus.

The present status of tonography may be described as that of a most promising method with which a number of important facts have already been established. At this point, the ground to be explored vastly exceeds what may be considered as known territory.

MEDICAL LICENSURE IN MICHIGAN



E. C. SWANSON, M. D. 1953

Medical Licensure in Michigan

By E. C. Swanson, M.D., Vassar, Michigan

The medical practice act was enacted in Michigan in the year 1899. Ten members were appointed to administer the same including two eclectics, two physiomedics, two homeopaths and four regulars. This group was known as the Michigan State Board of Registration in Medicine. At the present time they are appointed by the Governor of the State from a list of members suggested by the Michigan State Medical Society.

Their duties are as follows:

1. Examination of qualified applicants for licensure at Detroit, Ann Arbor, and Lansing.
2. Review credentials of interns and residents of hospitals and to permit only qualified persons to serve in such capacities.
3. Review and act on all written complaints concerning persons practicing medicine in the state.
4. Report violators of the act to the proper law enforcement agencies.
5. Attend regular business meetings in Lansing during the months of June and October of each year.

Dr. Swanson is a member Michigan State Board of Registration in Medicine. Paper and chart (1106) presented at MSMS County Secretaries' Conference, Lansing, February 25, 1953.

6. Attempt to protect the sick and injured public of the state by permitting only qualified persons to practice medicine.

The law was amended in 1951 and 1952 as it applies to graduates of foreign medical schools.

The state Board of Registration in Medicine, through the co-operation of the Deans of both medical schools in our state organized the "Deans Committee" whose duty it was to interview about seventy displaced medical doctors who had been registered in Michigan about that time.

Citizenship or application for the same and a rotating internship or its equivalent are also necessary for all applicants for licensure except those foreign graduates seeking additional post-graduate work in the teaching hospitals. These individuals may be granted yearly temporary licensure up to five years after which time these persons return to their respective countries.

All persons who graduated after 1935 in medicine must also present a certificate from the Basic Science Board of the State before being permitted to apply for examination for medical licensure.

The accompanying chart indicates the procedure necessary to obtain licensure in Michigan. (See opposite page.)

FRUCTOSE METABOLISM

(Continued from Page 1099)

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Michigan State Medical Society Past Presidents 1886-1893



In Michigan, 1886-1893 was a great era of "growing pains." Still the great lumbering state, the "inexhaustable supply" of her immense forests was faltering. The peak came in 1889 when almost 5½ billion board feet, 80 per cent of it pine, issued from Michigan sawmills. Railroad building was at its climax, and by 1893 most of the state's network was completed. The first gasoline-powered automobile was yet to come, but in 1887 Ransom E. Olds drove a three-wheeled steam contraption around Lansing.

By 1886, one-fifth of Detroit's population was supplied with running water. Incandescent lights and trolley cars were appearing, but common folks still had twenty years of kerosene lamps or gas before them. Grand Rapids had a small telephone exchange for less than 1,000 of the elite.

Grover Cleveland, defeated in 1888 by Benjamin Harrison, was re-elected in 1892, carrying with him to victory Vice-President Adlai E. Stevenson, a name which was to crop up in an election sixty years later!

(MSMS past presidents from 1894 to 1902 will be featured in an early issue)

To Work in Harmony Makes Progress

This is the first time that my name appears on the President's Page of *THE JOURNAL* of the Michigan State Medical Society, and I thank the members of the Michigan State Medical Society for the honor and privilege of representing them as their President. Looking back over the names of those men who have held the office and noting the progress made toward a better Medical Society, better public and intraprofessional relations during their tenures of office, makes me hope there will be no slowing down in that forward progress during the coming year. I pledge my best efforts to keep up that progress to the best of my ability.

This is written before the annual session at Grand Rapids, and the 1953 meetings of the House of Delegates. There are several rather controversial questions coming up for discussion and decision. It has been said by several of my medical friends that these questions "could split the medical profession wide open." This I do not believe. Ours is a representative form of government. A decision having been made by our representatives officially makes it incumbent on all of us to abide by that decision and do our best to work in harmony. That does not mean that differences of opinion regarding certain measures are not healthy or not welcome and that a loyal opposition in government is wrong. No organization or society can long live and progress without diversity of opinion and a willingness to work for change that is believed to be good. However, let us keep our deliberations and discussions on a high plane. Ours is an honorable profession, and its members are honorable men and women of whom we are proud.

President's



Message

L. W. Hull

President, Michigan State Medical Society

Editorial

NEEDED FEDERAL LEGISLATION

THERE are several pieces of Federal legislation in which the medical profession is and should be vitally interested, not only on our own account, but for the benefit of our patients. Some of these items we have been calling to the attention of our membership for many years, while others are of more recent date.

Of first and probably greatest importance is the unfairness and discrimination of the federal income tax laws in regard to providing an income during a person's older or retired low income years. In industry, executive employees are able to look with confidence on the later years. Retirement programs are set up which are charged to expense and thus are deductible for income tax purposes. This amounts to an increase in salary or wages, but is taxable only when it becomes a retirement benefit. This privilege is denied the self-employed. We have suggested for years that members of these callings of medicine, dentistry, law, architecture, engineering, clergy, and others be allowed to invest up to 15 per cent of income but not to exceed a stipulated sum, in retirement government bonds or other indicated securities. This income would be declared, but would be deducted for income tax purposes. Several bills have been introduced in Congress to accomplish this purpose. The present bill is the (Reid) Jenkins-Keogh measure which proposes an old-age pension plan. Recently, the officials of the American Medical Association have indicated interest and have testified in favor.

Another needed relief is an amendment to the Social Security act. As now constituted, a person on old-age assistance forfeits his benefits if he is disposed to work and earns as much as seventy-five dollars a month. The theory behind the program is that this social security is an insurance; that the person who benefits has earned his payments the same as though he had carried insurance in one of the recognized insurance companies. Not a State in the Union would allow an insurance company to withhold benefits because the insured tried to work. There is no justification for the federal government to penalize the old-age beneficiary because he is still able to work or willing to work, or for any other reason. As

medical men, we all know that one of the worst things that can happen to a man of ambition is to compel him to be inactive. For too many of our patients, the privilege of working is a life-saving boon. Most medical men do not come under the Social Security laws, but our patients do. This is a benefit we owe them. The Social Security penalty for continuing to do any amount of work should be removed without delay.

Several bills in Congress allow taxpayers to deduct medical and health expenses before income tax. A partial deduction has been allowed for years. If there is a justification for making any deduction, and we thoroughly believe in it, a total allowance should be made. The theory is to encourage the taxpayer to look after his health. This measure will make for more work and more bookkeeping on the part of the doctors, but the value to our patients is worth the extra effort.

A fourth measure is to us a crying need—Senate Joint Resolution No. 1.—The Senator Bricker proposed Amendment to the Constitution. It is now being opposed by the State Department, but we firmly believe the administration sponsored the idea in the Presidential campaign. Our (medical) interest is the very serious threat of encroachment of Socializing medicine through treaties and executive understandings. We have seen one Bureau of the United Nations adopt a socialized medicine program, the ILO. More can follow. In spite of the present opposition of Secretary Dulles we need this amendment. We believe there is sufficient self interest for the medical profession to again take a firm stand—the AMA House of Delegates did that once—they should do it again.

THE PRESIDENT'S HEALTH

THE philosophy of this editorial has been the subject of deep consideration for several years. In fact, we once wrote the editorial and put it aside because of the political implications involved. After the last election, we wrote the editorial published in January, 1953, which we hope our readers will again peruse.

We stressed the health security necessary in the choosing of a President rather than as it relates

EDITORIAL

to his term in office. No industry would think of appointing an executive without having him examined by one or more physicians chosen by itself. The rule is enforced even for the ordinary employes, as all medical men who have done any industrial practice know.

There is no more important "job" in the whole range of industry than the Presidency of the United States. The preservation of the President's health should be one of our most urgent responsibilities. That duty is recognized through the assignment of a military officer to be the President's personal physician. To that extent the government has discharged its responsibility—it has made available competent medical advice, subject to the President's own particular choice.

Every big employer of labor recognizes a first important requisite to the health and well being of its employes—the determination of good health before employment. The United States is an important employer of "labor." Its payroll is enormous, and involves men of vast responsibility, yet it fails to follow the fundamental rule recognized by all employers great or small, to determine the health of its chief employe before employment.

We are being just plain stupid and inefficient. During the past few years we have seen men elected to high office who had a health condition which should have prohibited that election. When a man is elected to any office, and especially the Presidency, he owes a duty to his fellow citizens to serve his term.

We are now at the beginning of a Presidential term. The next election is as far in the future as it may ever be. To change the rules now would be no criticism of or hardship on any individual. Now is the time for Congress to make provision for the proper and adequate health inspection of every candidate for that high office. President Eisenhower has served his life in the military. Every new assignment in the military service involves an immediate health survey. Many times that report has served to change the assignment.

This matter of the President's health has been brought forward just recently by the untimely death of a man who very easily might have been the President, Senator Robert Taft. No one suspected a year and a half ago, at the time of preparation for the nominating Convention, that Senator Taft was ill. Could a physical examination at that time have found his disease in time to avert the tragedy?

There is one columnist we very seldom read, Drew Pearson, but in his column of August 4, 1953, appears the following, which follows so closely our thinking that we are copying it:

*"Taft's Illness—*The tragic death of Sen. Taft has revived the question, very much discussed since Roosevelt's death, of physical examinations for candidates for the presidency and vice-presidency.

Following the death of President Roosevelt just five months after his election in 1944, it was charged that those close to him knew his health was failing and that he could not possibly last four years. It was charged that the big-city bosses, knowing this, had maneuvered to put their friend Harry Truman in the vice-presidency.

Sen. Taft was not in the same category. No one dreamed he was ailing. He appeared to be in excellent health when a candidate for the presidency last year. His case is more like that of Wendell Willkie, who died suddenly in the fall of 1944.

It was known by a few people but not by the public that Eisenhower had a heart condition which required him to be careful; and since entering the White House his doctor has ordered him to take long week ends and golf three times a week.

Unfortunately the strain on any man in the White House is so great that in recent years the life expectancy of our Presidents has decreased. That's why the tragic death of Sen. Taft has brought to a head the question of requiring all candidates for the presidency to undergo a thorough physical examination with the general results made known prior to the nomination conventions."

GROUP HEALTH AND ACCIDENT INSURANCE

UNDER INSTRUCTIONS of the House of Delegates of the Michigan State Medical Society, a special committee has been studying for some two years and has now devised a plan for group health and accident insurance for the members of the Michigan State Medical Society. There are many such group plans. Some of our counties have a plan covering limited numbers of the membership. Many of the national special societies have such plans, notably the American College of Surgeons, American Academy of Ophthalmology and Otolaryngology, and Academy of General Practice. All of these plans have their limitations as to eligibility to join and as to years covered.

The Committee reported at the House of Delegates in Grand Rapids, September 21, 1953, and after much discussion, was authorized to accept the proposal. Every member of the Society will receive two letters signed by the President and

(Continued on Page 1133)

Lynn Stinson — Good Citizen

"The things which have made me happy?"

One can picture the petite lady smiling slowly as she begins to write in a secluded cabin on Drummond Island, perhaps thinking aloud. With her quiet air of competence and inward confidence she phrases the words. It's not easy to answer at long distance—especially when one is "vacationing"—the request of a demanding editor and sum up a busy lifetime in a few sentences, even when many years still lie ahead.

"These things have made me happy," she writes, as her thoughts gain speed. "Trying to maintain a pleasant, orderly home for a beloved husband who carries on the hectic, demanding practice of a general practitioner. . . . Trying to do a good job of raising my two daughters; giving them the stability of home and surroundings which I didn't completely have in my youth; taking joy in their accomplishments, and sorrow in their failures. . . . Trying to be a good citizen in a community which has been so kind to me and has done so much for me."

And there you have it, a miniature portrait of Mrs. W. S. Stinson of Bay City, newly installed President of the Woman's Auxiliary to the Michigan State Medical Society. Shunning the classification of "clubwoman," she prefers to be known as Mrs. Average American Housewife.

What if she has given hours of her time to the Crippled Children's Society, served on the Board of Directors for the Family Service and Nursing Service associations in Bay City, and taken part in Red Cross, YWCA, and other community activities? These are but a part of being a "good citizen" and homemaker, and not ends in themselves, in the eyes of Lynn Stinson.

Delving into the early years of this Average American Housewife and Good Citizen, there is

little of the commonplace to be found. Even her very entrance into this world on a blizzardy January day not too many years ago was far from average, and it served notice of one outstanding fact which Lynn Stinson has come to know so well—that doctors are busy people. For she made her way alone into a little community 25 miles north of Grand Rapids "because a severely injured farmer needed

the services of the sorely taxed M.D. more than my mother did."

Her French mother originally had come to the community to teach the local school, while her father's parents had migrated there from Ireland by way of New York and Ohio.

"Perhaps this ancestry, coupled with the circumstances of my birth, have a bearing upon the dominant characteristics of which I am accused—an independence of mind and

spirit," explains Mrs. Stinson.

But let it be noted here that the accusation is her own, for those who have worked with her during the past eight years of Auxiliary experience, first as Bay County president and then through the ranks of state office, are much more likely to interpret these "dominant characteristics" as those of leadership and enthusiasm.

Coming from a family of teachers, there was never any doubt that Lynn Stinson would be a teacher. When her father died nine years after her birth, a schoolteacher brother, then twenty-three, became head of the household and there were frequent moves as he continued his education and progressed to larger schools.

"When I was graduated from Berrien Springs High School, I had attended five different schools and never lived longer than three years in one place," Mrs. Stinson recalls.

Still in her teens, her education completed "on



borrowed money" at Western Michigan College in Kalamazoo, Lynn Stinson became a schoolmarm. Her first year was spent at a township school (Schoolcraft county) deep in the Upper Peninsula, where a once-thriving lumbering community had degenerated into almost a "ghost town." The school building, while new, had a once-in-a-while Delco lighting system, a central pot-bellied stove, and a student body several of whose members were not reared in the most hygienic surroundings.

"It was an experience for which I have always been thankful," she recalls today, "for I learned how to live with and amuse myself, and that there are people for whom much can be done and who are grateful for the doing."

Next the young schoolteacher moved to Gaines, near Flint, meanwhile acquiring the fraternity pin of a senior in the University of Michigan Medical School. Then came Berkley, close to Detroit, where young W. S. Stinson, M.D., had become an intern at Grace Hospital.

"After a year, we decided to save bus fare, pool our resources, and, most important of all, make ourselves extremely happy," Mrs. Stinson reports. "So in August, 1930, Dr. Stinson and I were married. . . . For the first time since I was nine years old I had a real home of my own, beautiful to me, even if it was only a two-room apartment."

Two years later, Lue, the first of two daughters, arrived just in time to move to Bay City. For Dr. Stinson, having completed his residency at Ford Hospital, was ready to establish his own practice, "Depression Days" or not.

Lue, today, a Senior at the University of Michigan, majoring in creative writing, dreams with others of producing the Great American Novel. Mary, two and one-half years younger, entered her mother's Alma Mater this fall with hopes of becoming a kindergarten teacher.

Of her qualifications as President of the State Auxiliary, Mrs. Stinson says: "I have none, other than my belief in the importance of the organization, and a knowledge of the mechanics which I have acquired these past years. . . . I know I would never have accepted the office if my husband had not had a sincere faith in the Auxiliary and said that it was my duty to accept the obligation."

Those who know Lynn Stinson take her modest pledge to "do the best I can during the coming year" as a promise that she will attack the job with her characteristic vigor and responsibility.

And when the year is done, dreams Mrs. Stinson:

"Then I want to be let alone, so that I may have the joy—and frustrations—of building a new house."

That sounds reasonable enough, but time will tell whether the rest of the world will leave a Good Citizen like Lynn Stinson to herself when there's such a need for accomplishing things!

MICHIGAN STATE MEDICAL ASSISTANTS SOCIETY

(Continued from Page 1100)

employe but a person trained for her duties the same as an x-ray technician, practical or registered nurse.

The Michigan State Medical Assistants Society will continue in its efforts to render educational services and to promote projects beneficial to the physician and the public. Doctor, won't you, as an individual, support our efforts by encouraging your assistant to seek membership in our society, or by joint efforts help to organize a local group in your town? For further information, please write Mrs. Elizabeth E. Peck, President, 1301 David Whitney Bldg., Detroit 26, Michigan.

THE KIMMELSTIEL-WILSON SYNDROME

(Continued from Page 1094)

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Michigan's Department of Health

Albert E. Heustis, M.D., Commissioner

NEW CO-OPERATIVE PROGRAM LAUNCHED

Beginning October 1, the department will launch a program in co-operation with twenty-eight Michigan hospitals to recover immune serum globulin, poliomyelitis immune globulin, and other blood derivatives from placentas.

The department will establish freezer chests in twenty-eight hospitals and expects to process 60,000 placentas during the first year of operation. In addition to providing and installing the freezer units, the department will furnish storage containers, the pickup and delivery service, and will process and distribute the products.

Immune serum globulin and poliomyelitis immune globulin will be distributed by local health officers according to a statewide plan.

A year ago a resolution was passed by the Michigan Hospital Association recommending that all Michigan hospitals co-operate with the Michigan Department of Health in providing placentas free for the preparation of immune serum globulin and other blood derivatives with the understanding that the department would provide the products without charge.

At that time the department expected to install freezer chests in most hospitals within 110 miles of Lansing where over 1,000 births occurred each year. Other hospitals would be added as arrangements could be made.

Because of the urgent demand for poliomyelitis immune globulin, the department postponed this program in order to increase production of globulin in its fractionation laboratory.

By September 1, of this year, the department had produced all the poliomyelitis immune globulin that could be furnished for the current season, since the time required for processing and testing would mean that anything started after that date would not be ready until December.

Within the next year the Department plans to expand the program now being carried on with twenty-eight hospitals to include twenty more, providing a yearly total of 100,000 placentas.

NEW FOUR-COUNTY HEALTH DEPARTMENT

The Houghton-Keweenaw-Baraga-Ontonagon Health Department is now functioning, with Dr. C. A. E. Lund as director. Dickinson-Iron is now a two-county department.

HEALTH DIRECTORS APPOINTED

Michigan's local health departments have a higher percentage of directorships filled than ever before, and the level of training and experience is rising steadily.

C. E. Reddick, M.D., has been appointed director of

Bay City and Bay County Health Departments effective September 1.

L. V. Burkett, M.D., is acting director of the Flint City Health Department in addition to being director of the Genesee County Health Department.

W. R. Storer, M.D., is director of the St. Joseph County Health Department, coming to Michigan from Indiana.

NEW VISION CONSULTANT IN FIELD

Charles Weir is a recently appointed vision consultant in the department, working with Caroline Austin in community programs for planning vision services for children.

DIVISION ADDS DUTIES

In line with the policy of changing the plan of department organization to meet new developments and needs, the division of tuberculosis and venereal disease control has become the division of tuberculosis and adult health. Its former responsibilities are continued, with activities in the field of chronic disease control added. There will be no lessening of emphasis on the program for control of the venereal diseases which are still a major health concern in Michigan. Dr. John Cowan, in addition to continuing as director of the expanded division, will serve as medical consultant to the division of industrial health.

1952 SET RECORDS

The year 1952 established some interesting "firsts."

It was the first year in Michigan history without a death from scarlet fever or from typhoid fever.

Only two deaths were recorded from diphtheria, an all-time low.

Tuberculosis dropped out of the first ten causes of death for the first time, taking twelfth place.

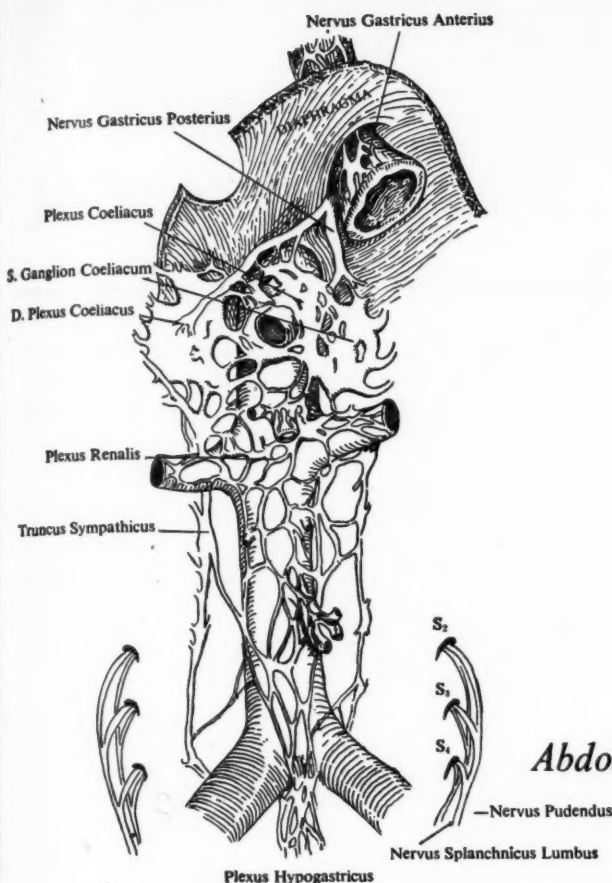
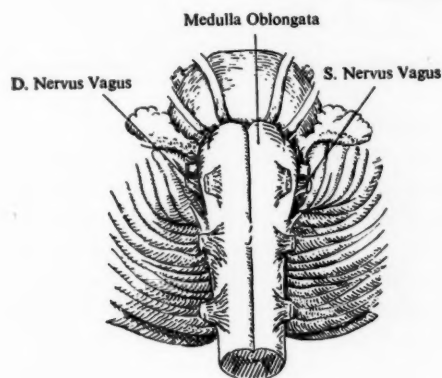
There were no smallpox cases or deaths, for the sixth consecutive year.

The general death rate was the lowest in our history, 8.8, the first time it has gone below 9.0.

NEW VENEREAL DISEASE PUBLICATION AVAILABLE

The Venereal Disease Division of the Public Health Service has informed us that complimentary copies of a new publication entitled, "Management of Chancroid, Granuloma Inguinale, and Lymphogranuloma Venereum in General Practice" are available on request by private physicians in Michigan. Request should be addressed to J. K. Shafer, Medical Director, Chief, Division of Venereal Disease, Public Health Service, Washington, D. C. The author of this publication is Dr. Robert B. Greenblatt, who is an outstanding authority and an earlier edition of this work has been widely used.

Central origin of the vagus nerves (parasympathetic)



Abdominal autonomic plexus (sympathetic)

Control of Gastric Motility and Spasticity in Peptic Ulcer with Banthine®

"The need¹ for suppressing gastric motility and spastic states is . . . fundamental in peptic ulcer therapy. Since the cholinergic nerves are motor and secretory to the stomach and motor to the intestines, agents capable of blocking cholinergic nerve stimulation are frequently used to lessen motor activity and hypermotility."

Banthine² "has dual effectiveness; it inhibits acetylcholine liberated at the postganglionic parasympathetic nerve endings and it blocks acetylcholine transmission through autonomic ganglia."

It has been shown¹ to diminish gastric motility and secretion significantly as well as intestinal and colonic motility.

The usual schedule of administration in peptic ulcer is 50 to 100 mg. every six hours, day and night, with subsequent adjustment to the patient's needs and tolerance. After the ulcer is healed, maintenance therapy, approximately half of the therapeutic dosage, should be continued for reasonable assurance of nonrecurrence.

Banthine® (brand of methantheline bromide) is supplied in: Banthine ampuls, 50 mg.—Banthine tablets, 50 mg.

It is accepted by the Council on Pharmacy and Chemistry of the American Medical Association.

1. Zupko, A. G.: Pharmacology and the General Practitioner, GP 7:55 (March) 1953.

2. McHardy, G. G., and Others: Clinical Evaluation of Methantheline (Banthine) Bromide in Gastroenterology, J.A.M.A. 147:1620 (Dec. 22) 1951.

SEARLE Research in the Service of Medicine



NEWS MEDICAL

Michigan Authors

William M. Tuttle, M.D., of Detroit, read a paper, "Surgical Management of Unresolved Pneumonia," at the State Medical Society of Wisconsin, and also was in a Round Table discussion, "Diagnostic Difficulties in Carcinoma of the Lung," October 6, 1953.

T. Leucutia, M.D., of Detroit, read a paper, "Plesiotherapy and Teletherapy with Various Radioactive Sources," at the State Medical Society of Wisconsin, October 6, 1953.

Hodge N. Crabtree, M.D., and Daniel C. Hunter, Jr., M.D., of Ann Arbor, are the authors of an article, "Carcinoma of the Thyroid," published in the *Archives Of Surgery*, August, 1953.

Reuben L. Kahn, Sc.D., and Elizabeth B. McDermott, are the authors of an article, "Specificity Results of Kahn and Cardiolipin Tests in Recent Official Evaluations," published in the *University of Michigan Medical Bulletin*, July, 1953.

Carey P. McCord, M.D., of Ann Arbor, is the author of an article, "Lead and Lead Poisoning in Early America," published in the *Industrial Medicine and Surgery*, September, 1953.

Clifford D. Benson, M.D., and Frank W. Prust, M.D., Detroit, are authors of "Traumatic Injuries of the Liver, Gall Bladder and Biliary Tract in the Infant and Child" which appeared in *Surgical Clinics of North America*, August, 1953.

Meyer O. Cantor, M.D., Detroit, is the author of "Perforation of Esophageal Ulcers Three Years after Total Gastrectomy: A Case Report," which appeared in the *American Journal of Digestive Diseases*, July, 1953.

No Doctor Draft Calls Expected for 12 Months, Committee Advises.—National Advisory Committee to Selective Service believes there will be no further call for physicians registered under the doctor draft for about a year. The committee, in a report dated September 2, and sent to state Selective Service directors, chairmen of state advisory committees, deans of medical schools and others, states: "It is not expected that there will be additional calls for physicians placed against the Selective Service System by the President for the next twelve months."

It adds: "As a result of Call No. 16 in August (for 542 physicians) and the increased number of volunteers, there have been commissioned a sufficient number of physicians to meet the needs of the armed forces for the immediate future. Those who have been commissioned from either the voluntary list or the Selective

Service call will be brought to active duty from time to time until this reservoir is exhausted." The committee says there may be some calls for dentists after several months.—*AMA Washington Letter*.

* * *

Nurses.—One out of every 400 people in the U. S. is working as a nurse, according to the Public Health Service's new "Health Manpower Source Book, Section II: Nursing Personnel." Also in the eighty-eight-page publication, PHS points out that general hospitals now employ four times as many nurses per patient as in 1938.—*AMA Washington Letter*.

* * *

Secretary Hobby Warns Against "Delusion" in Doctor Shortage.—Secretary Oveta Culp Hobby says that "our doctor shortage looks non-existent at first glance, but we should not delude ourselves." The Secretary of Health, Education, and Welfare then makes these comparisons: "Before World War I, we were graduating roughly 6,000 doctors a year. And now we are graduating only about 7,000 a year. In the U. S., while the population has jumped from 105 million to 160 million, the number of doctors graduating each year has climbed only 1,000." Mrs. Hobby's comments were made at the American Hospital Association annual meeting, and copies made available here.

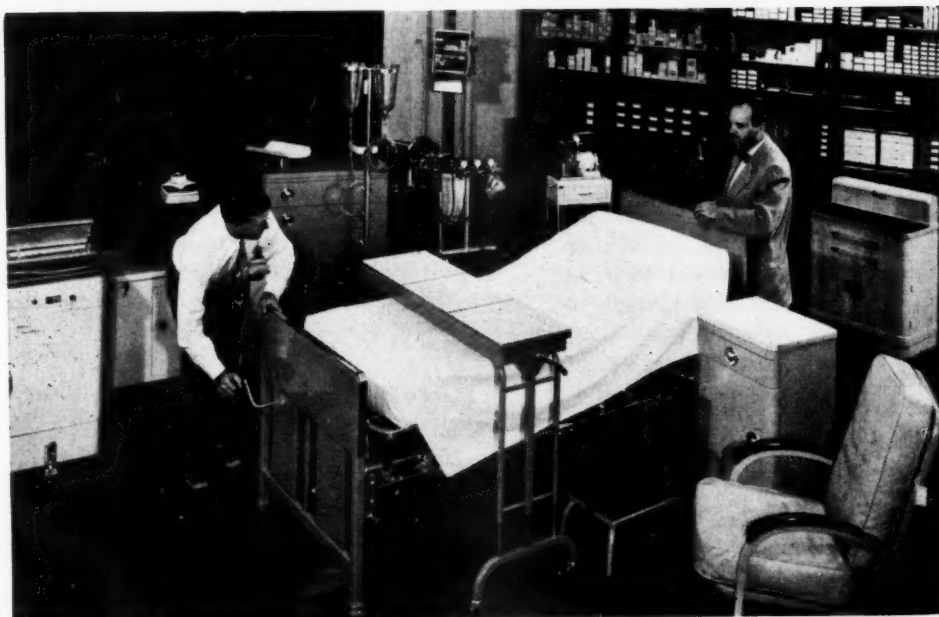
No way has yet been found to save the average American family "from destruction by catastrophic illnesses," Mrs. Hobby states and adds that the answer lies within the private enterprise system. To this end, she would have all organizations in the field of medicine apply "their brains, their experience, and their funds to the solving of this problem." Other points made by the Secretary: (1) the overwhelming majority of the American people have no desire whatsoever for socialized medicine in any form, (2) the uneven distribution of doctors finds a patient in a major city with recourse to six or eight specialists while a person in a small town may have no doctor within fifty or more miles.—*AMA Washington Letter*.

* * *

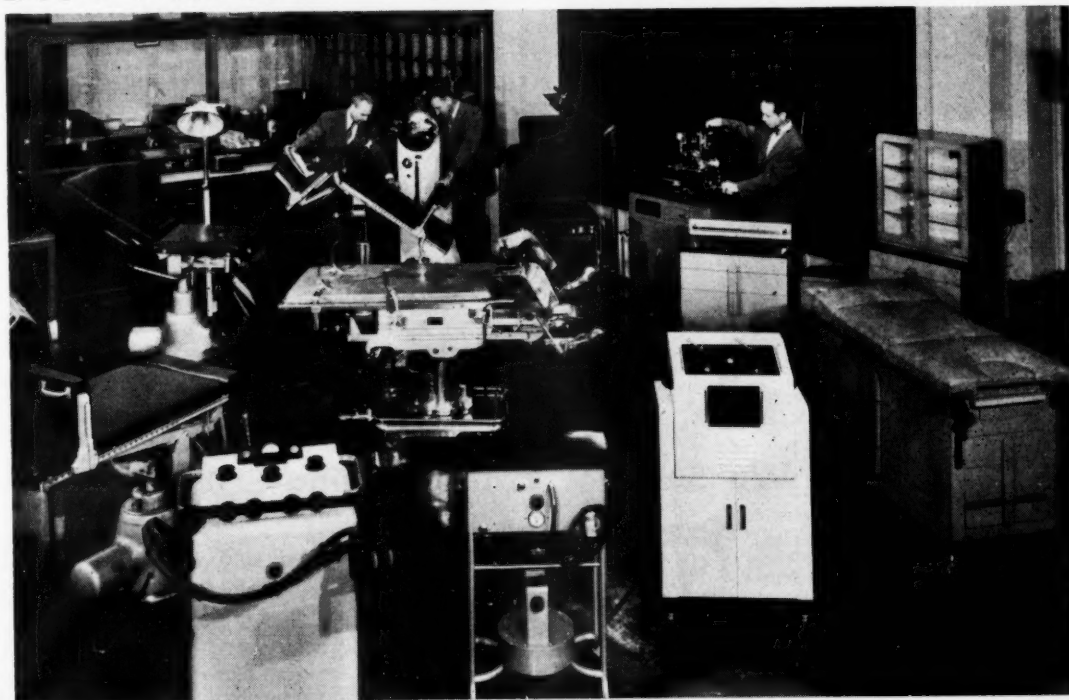
Miners Fund Spent \$56 Million on Medicine.—United Mine Workers Welfare and Retirement Fund's annual report for 1952 shows that medical and hospital care accounted for the second largest portion of its expenditures. From a total of \$138,963,949.52, medical and hospital expenses amounted to \$56,444,329.78. Of the latter, 79 per cent went to working miners and

(Continued on Page 1118)

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OCTOBER, 1953

Say you saw it in the Journal of the Michigan State Medical Society

1117

NEWS MEDICAL

(Continued from Page 1116)

their families. The report emphasized state and local medical society co-operation, saying that the group's medical program is "organized on the sound principle that responsibility for a medical care program must rest entirely in medical hands." Liaison committees have been established by state medical associations in many of the coal mining states to develop and maintain co-operative relations between practicing physicians and the medical administrators of the Fund. According to the report, "these committees have proved their usefulness and are due to be formalized and strengthened with the probable inclusion of university and state health representation . . . to insure a better total picture of the medical care problems of the state."—*AMA Washington Letter*.

* * *

Dr. Max Karl Newman, M.D., has been re-elected as Secretary-Treasurer of the American Society of Physical Medicine and Rehabilitation at the Annual Meeting, Palmer House, Chicago, August 31, 1953.

At the American Congress of Physical Medicine and Rehabilitation, Palmer House, Chicago, the following papers were given by Michigan Psychiatrists:

James Rae, Jr., M.D., University of Michigan—"Microthermy, Indications and Results," September 1, 1953.

Francis Sweeney, M.D., "Drugs in Multiple Sclerosis," September 1, 1953.

Max Karl Newman, M.D., "Electromyography: Comparison of Myelography and Electromyography following Laminectomy in Root Compression Syndrome," September 3, 1953.

* * *

Harold A. Ott, M.D., has resigned as Medical Director of Florence Crittenton Hospital, which position he filled on a part time basis since its inauguration in 1951. Edward S. Zawadzki, M.D., will assume this position, in addition to his duties as Pathologist and Director of Clinical Laboratories, on October 1. Dr. Ott will devote his entire time to private practice.

* * *

Regular Army Physicians May Now Resign.—Regular officers of the Army Medical Service may resign and leave the service under a new and more liberal Department of the Army policy, according to Major General Silas B. Hays, Acting The Surgeon General of the Army.

Beginning with officers having the longest periods of service, a number will be allowed to resign each month, upon recommendation of The Surgeon General, provided they have met with certain service requirements. Previously, resignations were accepted only in cases of extreme hardship.

According to the new policy, regular officers who have no obligatory commitments to the Army and have served in the Regular Army for a period of three years, are eligible for release. However, if they have served for

(Continued on Page 1120)



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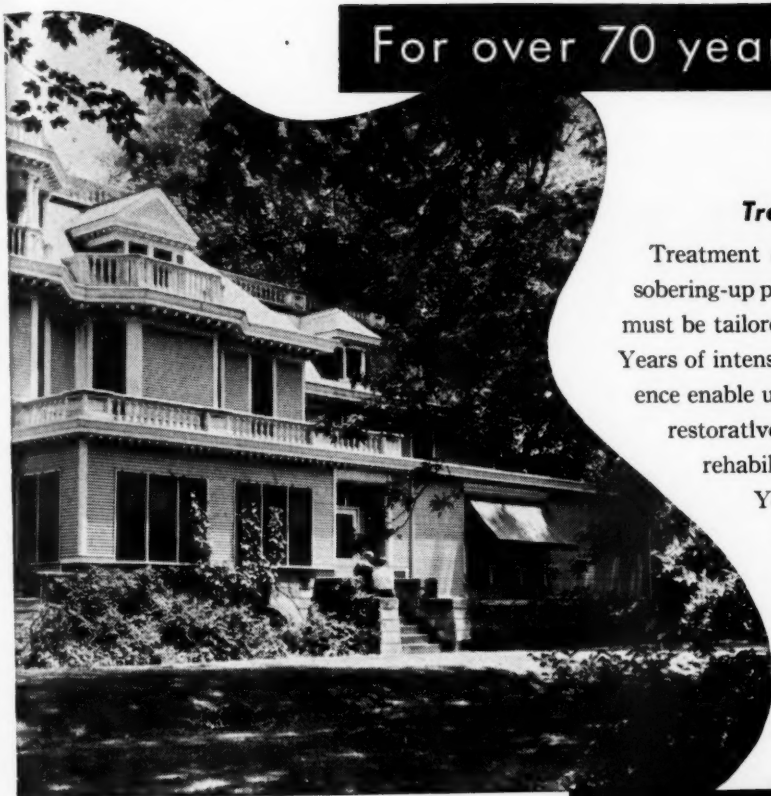


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Laboratory Fees in Hospital.....	5.00	10.00	15.00	20.00
Operating Room in Hospital.....	10.00	20.00	30.00	40.00
Anesthetic in Hospital.....	10.00	20.00	30.00	40.00
X-Ray in Hospital.....	10.00	20.00	30.00	40.00
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Adult	2.50	5.00	7.50	10.00
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(Continued from Page 1118)

less than eight years, they must accept commissions in the Reserve.

"Even though we expect to lose some officers in the next few months," General Hays said, "we believe the new policy will encourage physicians to enter the Regular Army because they will no longer feel that they will be committing themselves to an indefinite term of service. Actually, I believe that an increasing percentage of officers will find the military service so professionally stimulating and so pleasant that they will make it their career," General Hays concluded.

* * *

Promotions and Appointments.—The University of Michigan Medical School has announced a number of promotions in its Faculty:

Walter L. Whitaker, Ph.D., for five years Secretary of the Medical School, has been appointed Assistant Dean. He has been Associate Professor of Anatomy.

A. James French, M.D., promoted to Professor, Department of Pathology;

John F. Holt, M.D., promoted to Professor of Radiology;

Harold R. Blackwell, M.D., promoted to Associate Professor of Physiological Optics in the Department of Ophthalmology;

Fred M. Davenport, M.D., has been promoted to Associate Professor in the Department of Internal Medicine;

Arthur L. Drew, Jr., M.D., promoted to Associate Professor of Neurology;

Ivan F. Duff, M.D., promoted to Associate Professor of Internal Medicine;

Dorin L. Hinerman, M.D., promoted to Associate Professor of Pathology;

Muriel C. Meyers, M.D., promoted to Associate Professor of Internal Medicine;

Lila Miller, Ph.D., promoted to Associate Professor of Biological Chemistry;

James W. Rac, Jr., M.D., promoted to Associate Professor of Physical Medicine;

Herbert E. Sloan, Jr., M.D., promoted to Associate Professor of Surgery;

Martha R. Westerberg, M.D., promoted to Associate Professor of Neurology;

Lauren H. Woods, M.D., promoted to Assistant Professor of Pharmacology;

Reed O. Dingman, D.D.S., promoted to Assistant Professor of Surgery;

Leonard H. Elwell, M.D., promoted to Assistant Professor of Physiology;

Melvin M. Figley, M.D., promoted to Assistant Professor of Radiology;

Everett R. Harrell, Jr., M.D., promoted to Assistant Professor of Dermatology and Syphilology, and

Willard J. Hendrickson, M.D., promoted to Assistant Professor of Psychiatry.

(Continued on Page 1122)



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Autoclip technic is the same as used with Michel (Justrite) but because clips are automatically fed to the forceps, speed of application is limited only by the Surgeon's facility.

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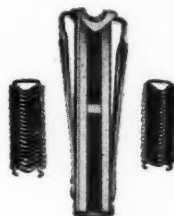


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(Continued from Page 1120)

Mis-use of Blue Cross and other plans is short-sighted, to say the least. We are not as secure in our positions as it looks on the surface. Remember our best weapon in the continual contest is proper treatment of both patient and insurance contract.—From *The Bulletin of the Wayne County and Michigan Academies of General Practice*, August, 1953.

* * *

Remus Robinson, M.D., Detroit, played competitive golf on a blustery day and came in with the best low gross among 235 medical golfers—a sterling 78.

The affair was the twenty-third annual tournament of the Wayne County Medical Society held at Lakepointe Country Club on August 5, 1953.

The first WCMS Golf Committee members (1930) were honored at the 1953 Golfers' Dinner. Golf life membership cards were presented by Chairman H. W. Rice, M.D., to J. Milton Robb, M.D., Harry F. Dibble, M.D., L. O. Lepley, M.D. Wm. J. Burns who was WCMS Executive Secretary at the time of the first tournament, and who acted as toastmaster for the 1953 dinner, also was made a golf life member.

Some thirty-seven members who played in the first tournament of 1930 were present for eighteen holes and dinner at the 1953 show.

One hundred prizes were distributed by Chairman Rice and Bruce Foster, M.D., Chairman of the Prize Committee.

A total of fifty-five residents and interns played in the WCMS tournament this year.

* * *

The Medical Society of the State of Wisconsin has unanimously approved proposals for a building project to house the Society's general offices and related activities. The new building will be constructed on Society-owned property on the south shore of Lake Monona in Madison. Total cost of the new structure is estimated at \$415,000.

* * *

Britain's socialized health service has piled up a whopping annual deficit, above the fees collected, of \$1,366,000,000. This does not seem to worry the beneficiaries! The British people are not disposed to quarrel about something that is free, or nearly so, and the public in general likes its health service, even though it has impaired medical standards.

The Chicago Daily News of July 2 states: "Nothing in Britain's experience changes our opinion that our own politicians would do better to make good on their promises to make everybody prosperous. Then we can all pay our own doctors' bills."

* * *

Illinois State Medical Society likes MSMS "Convention Reminder": "Before the 1954 Illinois meeting, I want some of the men to see your 1953 Convention Reminder, and perhaps we can develop something along a similar line rather than use the "screamer" as we have for too many years in the past. I hope you are of

(Continued on Page 1124)

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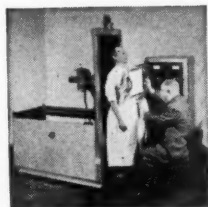
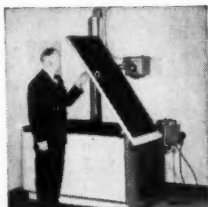
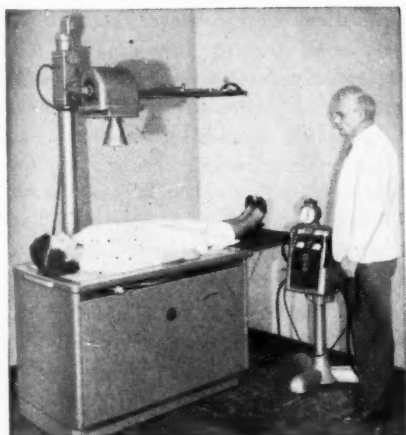
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(Continued from Page 1122)

the opinion that to copy someone else's products is one of the best compliments that can be paid."

* * *

John R. Rodger, M.D., of Bellaire, has been appointed chairman of the seventh annual Michigan Rural Health Conference to be held January 14-15, 1954. The place has not been selected as yet. It will be in a city other than Lansing, to conform with the pattern of holding the Rural Health Conference on the campus of Michigan State College every second year; the 1953 Conference was held on the East Lansing campus. The forthcoming Michigan Rural Health Conference again will be under the financial sponsorship of the Michigan Foundation for Medical and Health Education, Inc., and will be activated by the Michigan Health Council.

* * *

The American College of Chest Physicians offers three annual awards for the best original contribution, prepared by any medical student studying for the degree of doctor of medicine, on any phase relating to the diagnosis and treatment of chest disease. The winning contributions will be announced at the twentieth convention of the American College of Chest Physicians in San Francisco on June 17-20, 1954. For information, write the College at 112 E. Chestnut St., Chicago 11, Illinois.

* * *

"Government, industry and philanthropists are spending more than \$181,000,000 for medical research in 1953—ten times the amount spent for that purpose in 1941. This is a healthy increase—but we still spend over \$185,000,000 per year for monuments and tombstones," stated Harry J. Loynd, President of Parke, Davis & Company, Detroit, in a recent address before the American Pharmaceutical Association.

* * *

The American Medical Education Foundation's second annual report was released on July 7. This indicates the medical profession's determined effort to meet its share of the growing demand from the nation's medical schools for additional financial assistance.

The report lists not only the contributors to the Foundation but the names of individual M.D.'s who made a financial contribution to their own medical schools. For copies, write Hiram W. Jones, Executive Secretary, 535 N. Dearborn, Chicago 10, Illinois.

* * *

Certificates of Fellowship and Associate Fellowship for attendance at the MSMS-U of M postgraduate courses to July 1, 1952, were awarded to Michigan doctors of medicine as follows:

Fellowship certificates.—O. O. Beck, M.D., Birmingham; R. M. Bradley, M.D., Flint; R. S. Breakey, M.D., Lansing; Henry G. Chall, M.D., Detroit; Henry Cook, M.D., Flint; C. W. Colwell, M.D., Flint; J. H. Curtis, M.D., Saginaw; R. V. Daugharty, M.D., Cadillac; Nan H. Denholm, M.D., Flint; Frank Diskin, M.D., Muskegon; Theodore Finkelstein, M.D., Flint; Harold F. Grover, M.D., Flint; R. P. Gunn, M.D., Bay City; Hilda A. Habenicht, M.D., Jackson; Harold Kessler, M.D.,

(Continued on Page 1126)

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(Continued from Page 1124)

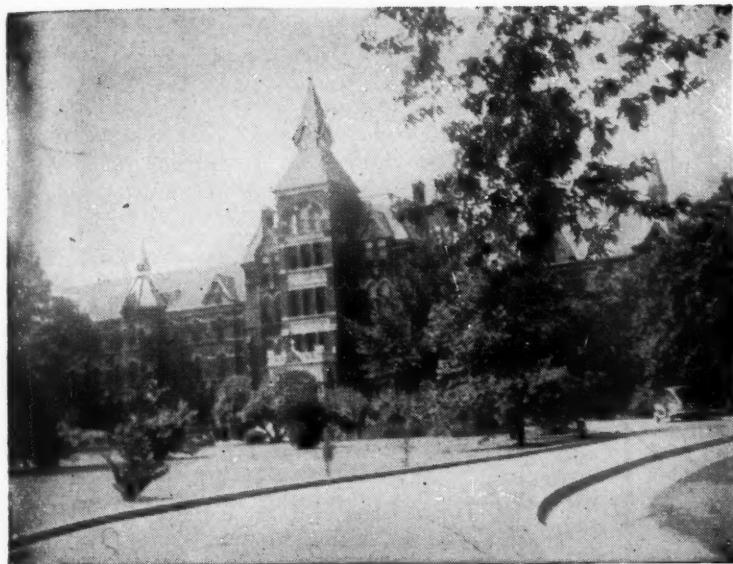
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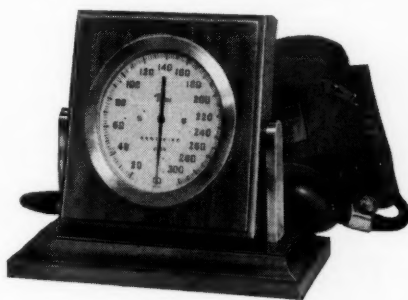
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General Surgery, two weeks, starting October 12
Surgery of Colon and Rectum, one week, starting October 26
Thoracic Surgery, one week, starting October 12
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* * *

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* * *

The *Town Crier* (Mark Beltaire in *Detroit Free Press*) asked on August 1, 1953: "Why keep pussyfooting on cancer? How long are authorities going to pussyfoot when it comes to letting us know what is really wrong with such great Americans as Senator Robert Taft? Chap in Arizona seems to be the first to mention the dread name of cancer. Why should it be kept under cover as if it were something disgraceful? I thought the old bugaboo was ended when Damon Runyon died . . . and the American Cancer Society made great capital out of the various mushy-mouthed ways his death was reported. The same with Senator Arthur Vandenberg. When are we going to learn that cancer can't be licked by denying its existence?"

A request for permission to quote this pertinent message in JMSMS elicited the following paragraph in Beltaire's column of August 17:

"MEMO TO BILL BURNS, executive director of the Michigan State Medical Society: You certainly have full permission to quote at any length from The *Town Crier* of August 1 on the subject headed 'Why Keep Pussyfooting on Cancer?' The piece referred to the secrecy concerning the late, great Senator Robert Taft's final illness. It was told later that Senator Taft preferred to keep the knowledge of his own tragedy from his ailing wife. That's understandable, of course. But as a guy who watched the jolting ravages of this horror in his own family, I sincerely detest the state of mind that denies its existence."

* * *

The American College of Physicians announces its postgraduate courses for the autumn of 1953: (a) In "Clinical Neurology," at Jefferson Medical College, Philadelphia, November 2-6, 1953; (b) in "Present-day Therapy and Its Physiological Basis," at University of Utah College of Medicine, Salt Lake City, November 9-13, 1953; (c) seminars in "Internal Medicine," Van-

(Continued on Page 1130)



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(Continued from Page 1128)

derbilt University School of Medicine, Nashville, Tenn., November 16-20, 1953, and (d) "The Newer Biological and Physiological Approaches to Clinical Problems" at University of Wisconsin Medical School, Madison, November 16-20, 1953.

* * *

Wayne County Medical Society's excellent scientific program for the 1953-54 season is as follows:

1953

October 5—Cornelius P. Rhodes, M.D., New York
"Advances in Cancer Diagnosis and Treatment."

November 9—Jerome W. Conn, M.D., Ann Arbor
"Diabetes in Obesity"

December 7—Otto Steinbrocker, M.D., New York
"Treatment of Arthritis"

1954

January 11—Grover C. Penberthy, M.D., William Tuttle, M.D., C. J. Frantz, M.D., C. Leslie Mitchell, M.D., John Webster, M.D.
Panel Discussion on "Trauma"

February 1—Julius Comroe, M.D., Philadelphia (Beaumont Lecture)
"Physiology of Respiration"

March 1—Arthur M. Master, M.D., New York
"The Care of the Patient with Acute Coronary Occlusion"

April 5—Robert B. Greenblatt, M.D., Augusta, Ga.
"Problems in Infertility"



Sixty years ago, tuberculosis was declared a reportable disease by the Michigan State Board of Health. Sixteen years later, reporting tuberculosis cases became a legal responsibility of physicians in this state.

Last year, ninety-four Michigan tuberculosis deaths—12 per cent of the total—were first reported as cases on death certificates. Does this reflect failure to diagnose the cases, or failure to report them? And what are the implications as to future cases resulting from these unisolated far-advanced cases?

—Michigan Tuberculosis Association

The American Goiter Association offers the Van Meter Prize Award of \$300 for the best essays submitted concerning original work on problems related to the thyroid gland. The awards will be made at the annual meeting of the Association in Boston, April 29-May 1, 1954. For further information, write John C. McClintock, M.D., Corresponding Secretary, 149 Washington Avenue, Albany 10, New York, no later than January 15, 1954.

* * *

To further broaden the uses of radiology and for the good of mankind, the James Picker Foundation for Radiological Research announces grants, fellowships and

NEWS MEDICAL

scholarships, for which applications may be submitted up to November 30, for next year. For application blank, write to the Foundation at 70 Broadway, New York 4, N. Y.

* * *

Medico-legal Institute, Detroit, December 10-11: This Institute, under the sponsorship of the State Bar of Michigan, will be held at the Sheraton-Cadillac Hotel with Herbert Winston-Smith, M.D., LL.B., University of Texas, as its Director.

Doctors of medicine, lawyers, professors and teachers of legal medicine and of law will be interested in hearing their confrere, Dr. Smith, at this two-day meeting which will be the first "integral short course" of an over-all three "interval course," each to follow at an approximate six-month period.

All MSMS members are cordially invited to attend this course. Advance registrations may be made by sending \$25.00 payable to the Michigan Law Institute, c/o State Bar of Michigan, 412 Olds Tower Bldg., Lansing, Mich.

* * *

The Fifth Michigan Cancer Conference, sponsored by the Cancer Control Committee of the Michigan State Medical Society, was held in the Kellogg Center, East Lansing, on Wednesday, October 21, in connection with the Annual Leadership Conference of the two Michigan Divisions of the American Cancer Society. A third co-sponsor was the Michigan Department of Health.

H. M. Nelson, M.D., Detroit, President of the American Cancer Society, presided at the morning session.

The Conference theme was "Behind the Scenes in Cancer Control." For the first time in Michigan, speakers drawn from the medical specialties concerned each discussed the part he plays in the diagnosis and treatment of cancer. J. S. DeTar, M.D., Milan, a general practitioner; S. G. Meyers, M.D., Detroit, an internist; R. L. Mustard, M.D., Battle Creek, a surgeon, and J. C. Cook, M.D., Detroit, a radiologist, took the audience into their consultation rooms and, in simple language, explained the contribution each specialty makes to the diagnosis and treatment of the cancer patient.

J. R. Heller, M.D., Director of the National Cancer Institute, U. S. Public Health Service, Bethesda, Md., reported on recent research problems in the cancer field. A five-year report on the highly successful and widely copied Hillsdale Plan for Tumor Detection was given by A. W. Strom, M.D., Hillsdale.

C. H. Keene, M.D., Chairman of the Cancer Control Committee, presided at the luncheon meeting.

Commissioner of Health A. E. Heustis, M.D., introduced Mr. Laurence J. Taylor of Hillsdale College who moderated a panel discussion on the morning papers and questions proposed by the audience.


The number of physicians exceeded by far the number attending any previous Conference. The total attendance also was much larger and indicated a growing interest in this form of combined professional and lay cancer education program.

OCTOBER, 1953

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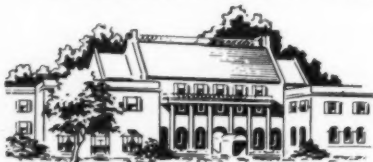
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Acknowledgment of all books received will be made in this column, and this will be deemed by us as full compensation to those sending them. A selection will be made for review, as expedient.

ENDOCRINE TREATMENT IN GENERAL PRACTICE. Edited by Max A. Goldzieher, M.D., and Joseph W. Goldzieher, M.D. New York: Springer Publishing Co., Inc., 1953. Price \$8.00.

This book combines the efforts of twenty-one contributors in an admirable fashion. The classical presentations of diseases of the individual endocrine glands was considered out of place in view of the problems of a busy daily practice. The authors act as consultants and approach the problem as it is seen in practice, considering the history and symptoms, signs, diagnosis, and the best therapeutic regime. Controversial opinions are avoided.

The material has been arranged and presented according to presenting symptoms and types of metabolic disturbances also. There are five major divisions: 1. Disorders related to Age; 2. Disorders of Metabolism and Nutrition; 3. Disorders of Organ Systems; 4. Disorders of Resistance and the Neoplastic Diseases; and 5. Hormone preparations Available. In these chapters the authors encompass all forms of therapy of the endocrinopathies as well as the use of hormones in conditions and diseases whether there is an endocrine deficiency or not. An example would be the use of androgens in order to promote protein synthesis and formation of new tissue.

This text has been well written; its arrangement makes ready reference. The printing and illustrations are good; and the coverage of the field is very complete. It can readily be recommended as an addition to the busy practitioner's library.

G.W.S.

DISEASES OF METABOLISM; Detailed Methods of Diagnosis and Treatment. Edited by Garfield G. Duncan, M.D., Director of Medical Division, Pennsylvania Hospital, and Clinical Professor of Medicine, Jefferson Medical College, Philadelphia, Pennsylvania. With Contributions by: Walter Bauer, Hugh R. Butt, Abraham Cantarow, Garfield G. Duncan, Frank A. Evans, Ferdinand Fetter, Joseph M. Hayman, Jr., Ancel Keys, Friedrich Klemperer, Rachmiel Levine, Edward H. Mason, Max Miller, John P. Peters, J. E. Rall, Rulon W. Rawson, Samuel Soskin, Tom D. Spies, Cecil Watson, Abraham White, and Priscilla White. Third Edition. Illustrated. Philadelphia: W. B. Saunders Co., 1952.

The recent advances in this field plus the widespread support the previous editions received made it imperative that a new and revised text be published. It is most welcome and will make many new friends for the authors. Seven new authors have been added while eight contributions to the second edition do not appear. A new chapter, "Porphyrin Metabolism" has been added as has an alphabetical author index.

Many chapters have been completely rewritten; such

IN MEMORIAM

as those dealing with carbohydrate metabolism, gout, water balance in health and disease, diseases of the thyroid and diabetes mellitus. This latter chapter is most comprehensive and follows the "exchange system" of diet prescription advocated by the American Diabetes Association.

Overlapping of subject material is inescapable and the editor has wisely refrained from eliminating duplication of subject material by different authors; this being especially true in chapters on Diseases of the Kidneys, Water Balance, and Mineral Metabolism. As we all know, the separation of metabolism from endocrinology is most difficult at times. The format is good and errors and omissions are almost entirely absent. The author and his contributors are to be commended for such an excellent work.

G.W.S.

GROUP HEALTH AND ACCIDENT INSURANCE

(Continued from Page 1111)

Chairman of The Council outlining the proposed plan of insurance. Acceptance is a personal prerogative, but it is hoped that every member who can, will avail himself of this advantageous insurance *in addition to what he now carries*. No doctor ever carries too much insurance of this nature.

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In Memoriam

ELMER L. HENDERSON, M.D.

With the death of Elmer L. Henderson, M.D., of Louisville, Kentucky, American medicine lost one of its most distinguished members and a vigorous fighter who championed many causes on behalf of the profession which he loved. The sixty-eight-year-old surgeon, who held nearly every high medical office that a doctor of medicine could achieve, died at his home July 30, following a lingering illness.

Dr. Henderson served as President of the world's two largest medical organizations, the AMA and the World Medical Association, and as Chairman of the AMA Board of Trustees and its Executive Committee. He served the armed forces in three wars, held every important medical office in his home state, and headed various regional associations.

He was called upon for his biggest and toughest job in 1948, when he was named Chairman of the Campaign Co-ordinating Committee in AMA's national education campaign against the socialization of medicine in the United States. From December, 1948, to September, 1952, he tackled this job with a stamina that knew no bounds, and his leadership in the vigorous and effective campaign won worldwide acclaim from the opponents of political medicine.

His leadership, his counsel, his understanding of human nature, and his enthusiasm in the fight for what he believed was right for his patients and for the nation will be greatly missed. American medicine has known few men like Dr. Elmer Henderson.

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